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88.

CATALOGUE

OF THE

PALÆOZOIC PLANTS.

CATALOGUE

OF THE

PALÆOZOIC PLANTS

IN THE

DEPARTMENT OF GEOLOGY AND PALÆONTOLOGY, BRITISH MUSEUM

(NATURAL HISTORY).

British Museum (Natural History)

BY

ROBERT KIDSTON, F.G.S.

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PREFACE.

This Catalogue was commenced by Mr. Kidston in February, 1883 (nearly a year before the Gallery which contains the Fossil Plant Collection had been opened to the public).

In order to prepare the present work the author first made a most careful examination of the entire collection of Palæozoic plants in the Department, and provisionally named all the specimens which passed through his hands. He also visited and studied the collections of Mr. J. McMurtrie at Radstock; those in the Museums of Bath, Bristol, Edinburgh, Glasgow, Newcastle; the Museum of Practical Geology, Jermyn Street, and many other public and private cabinets.

He has further devoted much time in 1884–85, to collecting specimens of fossil plants from the classical localities in Gloucestershire, Somerset, Monmouthshire and elsewhere, in order to observe the mode of occurrence of the various coal-plants *in situ*. As a result Mr. Kidston has enriched the collection by the addition of nearly 250 valuable specimens. In this task he has been aided by the Royal Society's Government Grants Fund.

The work of naming and cataloguing so large a collection has occupied a much longer time than was originally contemplated; but it is hoped that the Catalogue may prove useful to the student of Fossil Plants and be the means of stimulating other workers to take up a subject which offers to the enquirer so interesting a field of study and promises so large an opportunity for the development of original research.

HENRY WOODWARD.

Department of Geology,
January 1*st*, 1886.

INTRODUCTION.

The following Catalogue is an enumeration of the Palæozoic Plants, with their synonymy, contained in the Collection of the Department of Geology and Palæontology, British Museum (Natural History).

The classification employed is that at present adopted by the majority of Palæophytologists, with slight modifications, and requires no special remark. The plants are treated under the four great Geological Divisions of the Palæozoic Rocks, viz., Permian, Carboniferous, Devonian, and Silurian.

In the Botanical arrangement the Family is first given, following which is the Genus, with its author's name, date of its publication and reference to the work in which it first appeared. The specific name adopted follows, with its synonymy: the oldest name of the plant in question being used. When, however, any doubt exists, the oldest name is adopted about which there is a certainty as to the plant meant. For the facility of finding a reference, the synonyms are given under each species in the alphabetical order of the authors' names and not in order of date.

A list of the works consulted, with the dates and places of their publication, will be found at the end of the Catalogue, by referring to which the date of any particular reference can be ascertained.

In the Index, the accepted names of both genera and species are printed in ordinary type, the synonyms in italics.

In the preparation of this Catalogue I am indebted for assistance given in various ways, to the Officers and Assistants of the Geological Department, and more especially to Mr. Robert Etheridge, Jun., for his care in the revision of my references to authors, &c.; to Mr. J. McMurtrie, Radstock, and the Officials of the Bath and Bristol Museums; Mr. R. Howse, Newcastle-on-Tyne; to Dr. A. Geikie, F.R.S., Director-General of the Geological Survey of Great Britain; and Mr. G. Sharman, Museum of Practical Geology, London; to Dr. R. H. Traquair, F.R.S., Museum of Science and Art, Edinburgh;

the Rev. D. Landsborough, Kilmarnock; to Mr. James Bennie, Edinburgh, and Mr. John Young, F.G.S., Hunterian Museum, Glasgow, and to many other botanical and geological friends.

In dealing with Fossil Botany—perhaps one of the most difficult branches of Palæontology—I have adopted the views which appear to me to be supported by the most satisfactory evidence, but in a branch of Natural History, where new discoveries are being made almost daily, I of course reserve to myself the right of altering or modifying them, as future investigations may show where I have erred or been misled.

R. KIDSTON.

24, Victoria Place, Stirling, N.B.,
January 1*st*, 1886.

PERMIAN.

CATALOGUE

OF

FOSSIL PLANTS.

PERMIAN.

ALGÆ.

CHONDRITES, Sternberg, 1838.
Versuch Geognost. Botanisch. Darstellung Flora der Vorwelt. ii. p. 25.

Chondrites virgatus, Münster.

Chondrites virgatus.
Bronn, Index Palæont. p. 294.
Geinitz, Vers. d. Zechst. p. 22.
„ Die Leitpflanzen d. Rothl. p. 6.
„ Dyas, p. 132, pl. xxiv. fig. 5.
Göppert, Flora d. Perm. Form. p. 27.
Münster, Beitr. z. Petrefactenkunde, heft. v. p. 102, pl. xv. fig. 18.
Unger, Genera et Species, p. 20.

Remarks.—The only specimen in the Collection is the type figured by Münster in his Beitr. z. Petrefactenkunde, heft. v. plate xv. fig. 18.
Horizon.—Kupferschiefer.
Locality.—Bavaria : Riechelsdorf.

EQUISETACEÆ.

CALAMITES, Suckow, 1784.
Act. Acad. Theod. Palat. vol. v. p. 359.

Calamites major, Weiss.

Calamites major.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 119, pl. xiii. fig. 6, pl. xiv. fig. 1.

Calamites Suckowii, var. *major.*
Brongniart, in Murchison's Geol. Russia and Ural Mts. p. 11, pl. D, fig. 1.

Calamites cannæformis.
Schimper (in part), Traité d. Paléont. Végét. pl. xx, fig. 1.

Remarks.—This species seems closely related to *Calamites gigas*, Brongt., for which it might be easily mistaken.
Horizon.—Permian.
Locality.—Russia : Government of Perm.

Calamites decoratus, Eichwald sp.

Calamites decoratus.
Schimper, Traité d. Paléont. Végét. vol. i. p. 318.

Equisetites decoratus.
Eichwald, Lethæa Rossica, p. 178, pl. xiii. figs. 5–10.
Göppert, Foss. Flora d. Perm. Form. p. 30.

Horizon.—Permian.
Locality.—Russia : Mount Kachkabache, 140 miles S.W. of Slataoust, Ural Mountains.

Calamites striatus, Cotta sp.

Calamitea striata.
Bronn, Index Palæont. p. 198.
Cotta, Die Dendrolithen, pp. 67, 68, pl. xiv. figs. 1–4, pl. xv. figs. 1, 2.
Geinitz, Die Leitpflanzen des Rothl. p. 8.
Petzholdt, Uber Calamiten u. Steinkbild. p. 67, pls. vii. viii.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 212.
Unger, Genera et Species, p. 53.

Calamodendron striatum.
Brongniart, Dict. Universel d'Hist. Nat. vol. xiii. p. 99.
Geinitz, Dyas, p. 135.
Göppert, Foss. Flora d. Perm. Form. p. 180, pls. xxx. xxxi.

Calamites Cottaeanus.
Sternberg, Vers. ii. p. 51.

Remarks.—Among the specimens in the British Museum are portions of those figured by Cotta in his 'Dendrolithen,' pl. xiv. figs. 1 & 4, pl. xv. figs. 1, 2.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

ARTHROPITYS, Göppert, 1864.

Foss. Flora d. Perm. Formation, lief. 4. p. 183.*

Arthropitys bistriata, Cotta, sp.

Arthropitys bistriata.
Göppert, Foss. Flora d. Perm. Form, p. 185, pls. xxxii. xxxiii.
Schenk & Zittel, Handbuch d. Palæont. vol. ii. pt. iii. p. 236, figs. 168-171A, 1884.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 212.

Calamitea bistriata.
Bronn, Index Palæont. p. 198.
Cotta, Die Dendrolithen, p. 69, pl. xv. figs. 3, 4.
Geinitz, Die Leitpflanzen d. Rothl. p. 8.
Unger, Genera et Species, p. 53.

Calamites bistriatus.
Sternberg, Vers. ii. p. 51.

Calamodendron bistriatum.
Brongniart, Dict. Universel d'Hist. Nat. vol. xiii. p. 90.
Geinitz, Dyas, p. 135.

Remarks.—A portion of the specimen figured by Cotta in 'Die Dendrolithen,' pl. xv. fig. 3, as *Calamitea bistriata*, is in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

* This work forms vol. xii. of the 'Palæontographica,' 1864-65.

FILICACEÆ.

SPHENOPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.*

Sphenopteris dichotoma, Althaus.

Sphenopteris dichotoma.
Althaus, Palæontographica, vol. i. p. 30, pl. iv. fig. 1.
Geinitz, Vers. d. Zechst. p. 21.
Göppert, Foss. Flora d. Perm. Form. p. 90 (in part).
Schimper, Traité d. Paléont. Végét. vol. i. p. 381 (in part).
Unger, Genera et Species, p. 117.

Remarks.—*Sphenopteris dichotoma*, Gutbier (Vers. des Rothl. in Sachsen, p. 11. pl. viii. fig. 7), is a distinct species from that to which Althaus applied his name—Gutbier's fern has since been distinguished as *Sphenopteris semialata* by Weiss (Flora d. jüng. Steink. u. d. Rothl. p. 55). The counterpart of the type, figured by Althaus ('Palæontographica,' vol. i. pl. iv. fig. 1), is in the Collection.

Horizon.—Kupferschiefer. *Locality.*—Bavaria: Riechelsdorf.

Sphenopteris patens, Althaus sp.

Sphenopteris patens.
Geinitz, Vers. d. Zechstein, p. 21.

Caulerpites dichotomus.
Althaus, Palæontographica, vol. i. p. 31, pl. iv. fig. 2.
Unger, Genera et Species, p. 4.

Caulerpites patens.
Althaus, Palæontographica, vol. i. p. 30, pl. iv. fig. 3.
Unger, Genera et Species, p. 4.

Remarks.—Schimper† unites this species with *Sphenopteris dichotoma*, Althaus, but from a careful comparison of the two types, which are in the Collection, I find they must be kept separate.
Horizon.—Kupferschiefer.
Locality.—Bavaria: Riechelsdorf.

Sphenopteris erosa, Morris.

Sphenopteris erosa.
Eichwald, Lethæa Rossica, p. 79, pl. ii. fig. 2.
Göppert, Foss. Flora d. Perm. Form, p. 89.
Gutbier, Vers. d. Rothl. in Sachsen, p. 11. pl. viii. fig. 8.
Morris, in Murchison's Geol. Russia and Ural Mts. p. 3, pl. C, fig. 3.
Schimper, Traité d. Palæont. Végét. vol. i. p. 407.
Unger, Genera at Species, p. 109.

Horizon.—Permian.
Locality.—Russia: Mine Blagoviestchensxoi, Perm, Ural.

Sphenopteris Permica, Ettingshausen, sp. M.S.

Asplenites permicus, Ettings, M.S.

Remarks.—The description of this species is not yet published, but Baron von Ettingshausen has informed me that he expects it to appear in a short time.

Horizon.—Permian. *Locality.*—Moravia; Rossitz.

* In Mem. Mus. Hist. Nat. 1822, vol. 8.
† Traité, vol. i. p. 381.

NEUROPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.*

Neuropteris salicifolia, Fischer.

Neuropteris salicifolia.
Brongniart, in Murchison's Geol. Russia and Ural Mts. p. 2, pl. B, fig. 2.
Bronn, Index Palæont. p. 811.
Eichwald, Lethæa Rossica, p. 69.
Fischer, Bull. Soc. Imp. Nat. Moscou, 1840, p. 492.
Unger, Genera et Species, p. 75.
Weiss, Zeitschrift d. Deut. Geol. Gesell. vol. xxii. p. 871, 1870.

Horizon.—Permian.
Locality.—Russia : near Nijni-Troisk ; Biebebei.

CALLIPTERIS, Brongniart, 1849.

Dictionnaire Universel d'Histoire Naturelle, vol. xiii. p. 73.

Callipteris conferta, Schlotheim, sp.

Callipteris conferta.
Fontaine & White, Perm. or Upper Carb. Flora, p. 54, pl. xi. figs. 1–4.
Göppert, Foss. Flora d. Perm. Form. p. 104, pl. xiv. fig. 1 (var. *intermedia*).
Renault, Cours d. Botan. Foss. p. 153, pl. xiv. fig. 5, pl. xv. fig. 1, 1883.
Römer, Zeitsch. d. Deut. Geol. Gesell. vol. ix. p. 59.
Schimper, Traité d. Paléont. Végét. vol. i. p. 466, pl. xxxii.
Weiss, Verhand. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 76.

Neuropteris conferta.
Brongniart, Hist. d. Végét. Foss. p. 249.
Göppert, Syst. Fil. Foss. p. 204.
„ Gatt. d. Foss. Pflanzen. Lief. v. vi. p. 102, pls. viii. ix. figs. 2, 3.
Sternberg, Vers. i. fasc. iv. p. xvii. ; ii. p. 75, pl. xxii. fig. 5.
Unger, Genera et Species, p. 84.

Alethopteris conferta.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 73, pl. vi. figs. 1–11 & pl. vii. figs. 3–6.

Cyatheites confertus.
Geinitz, Dyas, p. 141, pl. xxvii, figs. 1–8.

Pecopteris gigantea.
Brongniart, Hist. d. Végét. Foss. p. 293, pl. xcii.

Alethopteris gigantea.
Sternberg, Vers. ii. p. 145.

Hemitelites giganteus.
Göppert, Syst. Fil. Foss. p. 331.
Unger, Genera et Species, p. 160.

Hemitelites giganteus var. *punctulatus.*
Göppert, Syst. Fil. Foss. p. 331.

Filicites giganteus.
Schlotheim, Petrefactenkunde, p. 404.

Pecopteris punctulata.
Brongniart, Hist. d. Végét. Foss. p. 295, pl. xciii. figs. 1, 2.

Cyphopteris punctulata.
Sternberg, Vers. ii. p. 121.

* In Mem. Mus. Hist. Nat., 1822, vol. 8.

Neuropteris decurrens.
Brongniart, Hist. d. Végét. Foss. p. 249.
Göppert, Syst. Fil. Foss. p. 203.
Sternberg, Vers i. fasc. iv. p. xvii. ; Vers. ii. p. 75, pl. xx. fig. 2.

Pecopteris sinuata.
Brongniart, Hist. d. Végét. Foss. p. 296, pl. xciii. fig. 3.
Sternberg, Vers. ii. p. 146.

Alethopteris sinuata.
Göppert, Syst. Fil. Foss, p. 318.

Callipteris conferta var. *sinuata.*
Weiss, Verhand d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 77.

Pecopteris Göpperti.
Brongniart, in Murchison's Geol. Russia and Ural Mts. p. 2, pl. A, fig. 2 *a–c*, pl. F, fig. 1 *a–e*.

Callipteris obliqua.
Göppert, Foss. Flora d. Perm. Form. p. 106.

Neuropteris obliqua.
Göppert, Gatt. d. Foss. Pflanzen, lief. v. vi. p. 106, pl. xi.
Unger, Genera et Species, p. 85.

Neuropteris tenuifolia.
Brongniart, in Murchison's Geol. Russia and Ural Mts. p. 3, pl. B, fig. 3 (excl. refs.)

Callipteris affinis.
Göppert, Foss. Flora d. Perm. Form. p. 105, pl. xiii, figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 468.

Hymenophyllites semialatus.
Geinitz, Die Leitpflanzen d. Rothl. pl. i. fig. 4 (excl. text).

Pecopteris neuropteroides.
Kutorga, Verh. d. Mineralog. Gesellsch. St. Petersburg, p. 75, pl. iv. fig. 3, 1844.

Horizon.—Kupferschiefer.
Localities.—Bavaria : Mansfield ; Aschbuch. Bohemia : Ottendorf, near Braunau. Germany : Kirburg, Nassau.

Callipteris conferta, var. **prælongata,** Weiss, sp.

Callipteris prælongata.
Renault, Cours d. Botan. Foss. p. 154, pl. xv. figs. 2, 3, 1883.

Alethopteris prælongata.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 81, pls. iv. v. figs. 1, 2.

Horizon.—Kupferschiefer.
Locality.—Bohemia.

Callipteris Fischeri, Brongniart sp.

Callipteris Fischeri.
Weiss, Zeitsch d. Deut. Geol. Gesell. vol. xxii. p. 871, pl. xxi. *a*. fig. 6 *a-b*.

Odontopteris Fischeri.
Brongniart, in Murchison's Geol. Russia and Ural Mts. p. 4, pl. A. fig. 4, pl. F, fig. 3.
Bronn, Index Palæont. p. 838.
Schimper, Traité d. Paléont. Végét. vol. 1, p. 464.

Callipteris Wangenheimi.
Göppert, Foss. Flora d. Perm. Form. p. 106.

Pecopteris Wangenheimi.
Brongniart in Murchison's Geol. Russia and Ural Mts. p. 2, pl. B, fig. 1, pl. F, fig. 2.
Unger, Genera et Species, p. 184.

Neuropteris Wangenheimii.
Bronn. Index Palæont. p. 812.

Horizon.—Permian.
Locality.—Russia : Bielebei ; Orenbourg.

ODONTOPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 34.

Odontopteris Dufresnoyi ? Brongniart, sp.

Odontopteris Dufresnoyi.
Schimper, Traité d. Paléont. Végét. vol. i. p. 461.
Weiss, Zeitsch. d. Deut. Geol. Gesell, vol. xxii. p. 857, 1870.

Neuropteris Dufresnoyi.
Brongniart, Hist. d. Végét. Foss. p. 246, pl. lxxiv. fig. 4.
Bronn, Index Palæont. p. 810.
Göppert, Syst. Fil. Foss. p. 200.
Kutorga, Zweiter Beitr. z. Pal. Russlands, p. 29, pl. vi. fig. 3.
Unger, Genera et Species, p. 81.

Otopteris Dufresnoii.
Lindley and Hutton, Fossil Flora, vol. ii. p. 142.

Horizon.—Permian.
Locality.—Bohemia : Ottendorf, near Braunau.

FERN-STEMS.

PSARONIUS (Cotta, emend.) Göppert, 1864.

Foss. Flora d. Perm. Formation, p. 46.

Psaronius Ungeri, Corda.

Psaronius Ungeri.
Corda, Flora d. Vorwelt, p. 95.
Göppert, Foss. Flora d. Perm. Form. p. 63, pl. v, fig. 6.
Schimper, Traité d. Paléont. Végét. vol. i, p. 723.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 218.
Unger, Genera et Species, p. 217.

Psaronius helmintholithus.
Cotta (in part), Dendrolithen, p. 33, pl. vi. fig. 2.

Remarks.—The specimen in the Collection is a portion of that figured by Cotta in 'Die Dendrolithen,' pl. 6, fig. 2.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

Psaronius infractus, Unger.

Psaronius infractus.
Corda, Flora d. Vorwelt, p. 99, pl. xxxiv.
Göppert, Foss. Flora d. Perm. Form. p. 57, pl. v., figs. 1, 2.
Renault, Cours d. Botan. Foss. p. 143, pl. xxv. figs. 1, 2 & 4, 1883.
Schimper, Traité d. Paléont. Végét. vol. 1, p. 721.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 218.
Unger. Genera et Species, p. 219.

Psaronius helmintholithus.
Cotta (in part), Die Dendrolithen, p. 31, pl. vi, fig. 3, and pl. A, fig. 2.

Remarks.—The specimen in the Collection is portion of that figured by Cotta as *Psaronius helmintholithus* on pl. v. fig. 3 of his 'Dentrolithen.
Horizon.—Rothliegende.
Locality.—Saxony: Chemnitz.

Psaronius helmintholithus, Cotta (in part).

Psaronius helmintholithus.
Cotta (in part), Die Dendrolithen, p. 31, pl. v. figs. 1–3.
Göppert, Foss. Flora d. Perm. Form. p. 61.
Renault, Cours d. Botan. Foss. p. 144, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 722.
Stenzel, Über die Staarsteine, p. 842.
Sternberg, Vers. ii. p. 173.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 218.
Unger, Genera et Species, p. 218.

Psaronius medullosus.
Corda, Flora d. Vorwelt, p. 102, pl. xxxix.
Unger, Genera et Species, p. 220.

Horizon.—Rothliegende.
Locality.—Bohemia: Neu-Pakau.

Psaronius simplex, Unger.

Psaronius simplex.
Corda, Flora d. Vorwelt, p. 95.
Göppert, Foss. Flora d. Perm. Form. p. 67, pl. vi. figs. 3, 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 725.
Stenzel, Über die Staarsteine, p. 857.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 220.
Unger, Genera et Species, p. 217.

Psaronius helmintholithus.
Cotta (in part), Die Dendrolithen, p. 33, pl. vi. fig. 1.

Horizon.—Rothliegende.
Locality.—Saxony: Chemnitz.

Psaronius Haidingeri, Stenzel.

Psaronius Haidingeri.
Göppert, Foss. Flora d. Perm. Form. p. 74, pl. v. fig. 8.
Renault, Cours d. Botan, Foss. p. 147, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 728.
Stenzel, Über die Staarsteine, p. 878, pl. xxxix.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 222.

Psaronius asterolithus.
Cotta (in part), Die Dendrolithen, p. 29, pl. A, fig. 1, and pl. iv. figs. 3, 4.

Remarks.—The specimens of this species in the Collection are portions of those figured by Cotta in 'Die Dendrolithen' on pl. A, fig. 1, and pl. iv. fig. 3, as *Psaronius asterolithus.*
Horizon.—Rothliegende.
Locality.—Saxony: Chemnitz.

Psaronius asterolithus, Cotta (in part).

Psaronius asterolithus,
Cotta (in part), Die Dendrolithen, p. 29, pl. iv. fig. 1, 2.
Göppert, Foss. Flora d. Perm. Form. p. 77.
Renault, Cours d. Botan. Foss. p. 147, pl. xxiv. figs. 5, 6, 1883.

Schimper, Traité d. Paléont. Végét. vol. i. p. 229.
Stenzel, Uber die Staarsteine, p. 853, pl. xxxiv. fig. 4, and pl. xl.
Sternberg, Vers. ii. p. 173.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 222.
Unger, Genera et Species, p. 222.

Psaronius speciosus.
Corda, Flora d. Vorwelt, p. 106, pl. xliv. figs. 1–4.
Unger, Genera et Species, p. 221.

Psaronius dubius.
Corda, Flora d. Vorwelt, p. 108, pl. xxx. figs. 5–12.
Sternberg, Vers. ii. p. 173.
Unger, Genera et Species, p. 221.

Psaronius Parkeriæformis.
Corda, Flora d. Vorwelt, p. 110, pl. xlvii. figs. 3–6.
Sternberg, Vers. ii. p. 173.
Unger, Genera et Species, p. 222.

Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

Psaronius, sp.

Remarks.—In addition to the various species of this genus which have been already mentioned, there are in the Collection a number of polished sections showing structure, which have been named by Cotta *Psaronius helmintholithus*, but as under this name Cotta included several species which have since been described by different authors, and as from the want of microscopical sections I have not been able to satisfactorily relegate these specimens to their various species, they are merely placed under the generic name.

By those interested in the subject, the following works may be consulted :—

Cotta, Die Dendrolithen, 1832.
Corda, Beitr. zur Flora d. Vorwelt, 1845.
Göppert, Die Fossile Flora der Perm. Formation, 1865.
Schimper, Traité d. Paléont. Végét. vol. i. 1869.
Stenzel, Uber die Staarsteine (Verh. d. Kaiser. Leop. Carl. Akad. d. Naturforscher. vol. xxiv.), 1854.
Sterzel, Die Fossilen Pflanzen des Rothliegenden von Chemnitz (in der Geschichte der Palaeontologie.)

Horizon.—Rothliegende.
Localities.—Saxony : Chemnitz. Thuringia : Ilmenau ; Kiffhäuser.

ZYGOPTERIS, Corda, 1845.

Beitr. zur Flora der Vorwelt, p. 81.

Zygopteris primæva, Corda.

Zygopteris primæva.
Corda, Flora d. Vorwelt, p. 81.
Göppert, Foss. Flora d. Perm. Form. p. 43.
Renault, Cours d. Botan. Foss. p. 101, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 696.
Sterzel, Foss. Pflanzen des Rothl. v. Chemnitz, p. 216.
Unger, Genera et Species, p. 200.

Tubicaulis primarius.
Cotta, Die Dendrolithen, p. 19. pl. i. figs. 1, 2.

Remarks.—A portion of the specimen figured by Cotta as *Tubicaulis primarius*, on pl. i. fig. 1 of his 'Dendrolithen' is in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

ASTEROCHLÆNA, Corda, 1845.

Beitr. zur Flora der Vorwelt, p. 81.

Asterochlæna Cottai, Corda.

Asterochlæna Cottai.
Corda, Flora d. Vorwelt, p. 81.
Göppert, Foss. Flora d. Perm. Form. p. 41, pl. viii. fig. 1, pl. ix. fig 1.
Schimper, Traité d. Paléont. Végét. vol. i. p. 697.
Sterzel, Foss. Pflanzen d. Rothl. v. Chemnitz, p. 214.
Unger, Genera et Species, p. 200.

Tubicaulis (?) ramosus.
Bronn, Index Palæont. p. 1310.
Cotta, Dendrolithen, p. 23, pl. iii. figs. 1–3.

Remarks.—A portion of the specimen figured by Cotta as *Tubicaulis (?) ramosus*, on pl. iii. fig. 1 of his 'Dendrolithen,' is in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony: Chemnitz.

SELENOCHLÆNA, Corda, 1845.

Beitr. zur Flora der Vorwelt, p. 81.

Selenochlæna Reichi, Corda.

Selenochlæna Reichi.
Corda, Flora d. Vorwelt, p. 81.
Göppert, Foss. Flora d. Perm. Form. p. 44.
Schimper, Traité d. Paléont. Végét. vol. i. p. 697.
Unger, Genera et Species, p. 200.

Tubicaulis solenites.
Cotta, Die Dendrolithen, p. 21, pl. ii. figs. 1–3.

Remarks.—A portion of specimen figured by Cotta in his 'Dendrolithen' (pl. ii. fig. 3) is contained in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony: Chemnitz.

TEMPSKYA, Corda, 1845.

Beitr. zur Flora der Vorwelt, p. 81.

Tempskya macrocaula, Corda.

Tempskya macrocaula.
Corda, Flora d. Vorwelt, p. 82, pl. lviii. figs. 6–8.
Göppert, Foss. Flora d. Perm. Form. p. 44.
Schimper, Traité d. Paléont. Végét. vol. i. p. 698.
Unger, Genera et Species, p. 201.

Porosus communis.
Cotta, Die Dendrolithen, p. 39, pl. viii. figs. 1, 2, & 3.

Remarks.—The Collection contains a portion of the specimen figured by Cotta in 'Die Dendrolithen' (pl. viii. figs. 1, 2).
Horizon.—Rothliegende.
Locality.—Saxony: Rüdigsdorf, near Chemnitz.

MEDULLOSA, Cotta, 1832.

Die Dendrolithen, p. 59.

Medullosa elegans, Cotta.

Medullosa elegans.
Brongniart, Dict. Universel d'Hist. Nat vol. xiii. p. 109.
Cotta, Die Dendrolithen, p. 62, pl. xii. figs. 1–5.

Geinitz, Die Leitpflanzen d. Rothl. p. 20.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 131.
Renault, Cours d. Botan. Foss. p. 162, 1883.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 196.
Sterzel, Foss. Pflanzen d. Rothl. v. Chemnitz, p. 224.
Unger, Genera et Species, p. 303.

Stenzelia elegans.
Göppert, Foss. Flora d. Perm. Form. p. 218, pls. xxxviii. xxxix.

Remarks.— See also Renault, Étude du genre *Myelopteris* (Mém. l'Acad. Sciences de l'Institut de France, vol. xxii. No. 10).
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

Medullosa stellata, Cotta.

Medullosa stellata.
Brongniart, Dict. Universel d'Hist. Nat. vol. xiii. p. 109.
Bronn, Index Palæont. p. 708.
Cotta, Die Dendrolithen, p. 66, pl. xiii. figs. 1–6.
Geinitz, Dyas, p. 147.
„ Leitpflanzen d. Rothl. p. 20.
Göppert, Foss. Flora d. Perm. Form. p. 209, pl. xl. figs. 2–5, pl. xli. figs. 1–8, pls. xlii. xliii. figs. 1, 2, and pl. lxiii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 197.
Sterzel, Foss. Pflanzen d. Rothl. v. Chemnitz, p. 224
Unger, Genera et Species, p. 303.

Remarks.—Portions of the specimens figured by Cotta in his 'Dendrolithen' (pl. xiii. figs. 1 & 4) are in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

Medullosa porosa, Cotta.

Medullosa porosa.
Brongniart, Dict. Universel d'Hist. Nat. vol. xiii. p. 109.
Cotta, Die Dendrolithen, p. 63, pl. xii. figs. 6, 7.
Geinitz, Die Leitpflanzen d. Rothl. p. 20.
Göppert, Foss. Flora d. Perm. Form. p. 217.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 197.
Sterzel, Foss. Pflanzen d. Rothl. v. Chemnitz, p. 224.
Unger, Genera et Species, p. 303.

Remarks.—Portions of the specimens figured by Cotta in his 'Dendrolithen (pl. xii. figs. 6, 7) are in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

CYCADACEÆ.

PSYGMOPHYLLUM, Schimper, 1870.
Traité d. Paléont. Végétale, vol. ii. p. 192.

Psygmophyllum expansum, Brongniart, sp.

Psygmophyllum expansum.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 193.

Noeggerathia expansa.
Brongniart, in Murchison's Geol. Russia and Ural Mts. vol. ii. p. 1, pl. B, fig. 4, *a*, *b*, pl. E, fig. 1, *a–d*.

Bronn, Index Palæont. p. 815.
Eichwald, Lethæa Rossica, p. 257, pl. xiii. figs. 17, 18 (? 19, 20).
? Geinitz, Neues Jahrbuch. 1869, p. 458.
Göppert, Foss. Flora d. Perm. Form. p. 156.
Unger, Genera et Species, p. 104.

Cyclopteris gigantea.
Kutorga, Zweiter Beitr. z. Palaeont. Russl. p. 33, pl. ii. fig. 7.

Bockschia dilatata.
Fischer, Bull. Soc. Imp. Nat. Moscou, p. 491, 1840.

Horizon.—Permian.
Locality.—Russia: Mine Kamenskoi, Perm. Ural.

Psygmophyllum cuneifolium, Kutorga sp.

Psygmophyllum cuneifolium.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 194.

Nœggerathia cuneifolia.
Brongniart, in Murchison's Geol. Russia and Ural Mts. vol. ii, p. 1, pl. A, fig. 3.
Eichwald, Lethæa Rossica, vol. i. p. 256, pl. xiii. fig. 16.
Göppert, Foss. Flora d. Perm. Form. p. 155.

Nœggerathia Kutorgai.
Bronn. Index Palæont. p. 815.
Göppert, Gatt. d. Foss. Pflanzen, fasc. v. and vi. p. 107.
Unger, Genera et Species, p. 103.

Sphenopteris dissoluta.
Kutorga, Zweiter Beitr. z. Palaeont. Russl. p. 32, pl. vi. fig. 4.

Cheilantheites Kutorgai.
Fischer, Bull. Soc. Imp. Nat. Moscou, p. 494, 1840.

Horizon.—Permian.
Locality.—Russia: Mine Ivanovskoi, Perm, Ural.

CARDIOCARPUS, Brongniart, 1828.
Prodrome des Végétaux Fossiles, p. 87.

Cardiocarpus triangularis, Geinitz.

Cardiocarpus triangularis.
Geinitz, Dyas, p. 145, pl. xxxi, figs. 12–15.

Horizon.—Kupferschiefer.
Locality.—Saxony: Trebnitz, near Gera.

CONIFERÆ.

WALCHIA, Sternberg, 1825.
Versuch einer Geognostisch-botanischen Darstellung der Flora der Vorwelt, I. fasc. iv. p. xxii.

Walchia piniformis, Schlotheim sp.

Walchia piniformis.
Geinitz, Die Leitpflanzen d. Rothl. p. 17, pl. ii. figs. 10, 11 (excl. figs. 12, 13).
„ Dyas, p. 143, pl. xxix. fig. 7 (excl. figs. 5, 6), pl. xxx. fig. 1, and pl. xxxi. figs. 2–4 (excl. figs. 5–10).
„ Neues Jahrbuch, 1869, p. 457.

Göppert, Foss. Flora d. Perm. Form. p. 236, pls. xlviii. xlix. and lii. figs. 1–5.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 276.
Gümbel, Denksch. Bot. Gesell. Regensburg, p. 104, pl. viii. fig. 9, 1859.
Gutbier, Vers. d. Zechst. u. Rothl. p. 23, pl. x. figs. 3–7.
Heer, Jahrbuch d. k. k. Geol. Reichsanstalt, vol. xxii. p. 292.
„ Flora Foss. Helv. lief. i. p. 57, pl. xviii. figs. 8, 9, and pl. xxii. fig. 1.
Lesquereux, Bull. Mus. Comparative Zool. Harvard Col. vol. vii. p. 245, 1882.
Römer, Zeitsch. d. Deut. Geol. Gesell. vol. ix. p. 58.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 236, pl. lxxiii. figs. 1, 2, 4, and 8.
Sternberg, Vers. i. fasc. iv. p. xxii.
Sterzel, Foss. Pflanzen d. Rothl. v. Chemnitz, p. 226.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 179, pl. xvii. figs. 1–2.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westphalens, 1868, p. 94.
Zeiller, Végét. Foss. Terr. Houil. p. 154, pl. clxxvi. fig. 3.*

Lycopodiolithes piniformis.
Schlotheim, Petrefactenkunde, p. 415, p. xxiii, fig. 1*a*, and pl. xxv. fig. 1.

Lycopodites piniformis.
Brongniart, Prodrome, p. 83.
Geinitz, Vers. d. Steink. in Sachsen, p. 33, pl. xxii. figs. 1–6.

Lycopodites pinnatus.
Göppert, Syst. Fil. Foss. p. 425.

Walchia pinnata.
Bronn, Lethæa Geog. vol. i. p. 151, pl. viii. fig. 1 1851–56.
Gutbier, Vers. d. Zech. u. Rothl. p. 23, pl. x. figs. 8–10.

Caulerpites Bronnii.
Sternberg, Vers. ii. p. 23, pl. xxvi. (non pl. xviii.)

Lycopodites Bronnii.
Roehl, Foss. Flora d. Steinkohlen-Form. Westph. p. 145, pl. xxix. fig. 13.
Unger, Genera et Species, p. 274.

Lycopodites Stiehlerianus.
Göppert, Foss. Flora d. Ubergangs. p. 170, pl. xxv. figs. 1–4.

Lepidostrobus geminæformis.
Göppert, Foss. Flora d. Perm. Form. p. 142, pl. xix. figs. 14–16, pl. lii. fig. 3.

Voltzia heterophylla.
Göppert, Foss. Flora d. Perm. Form. p. 232, pl. xlvii.

? Walchia foliosa.
Eichwald, Lethæa Rossica, p. 235, pl. xix. fig. 1.
Rhode, Beitr. z. Pflanzenkunde d. Vorwelt, p. 33, pl. ix. fig. 1.

Horizon.—Permian.

Localities.—Bavaria: Harsdorf. Bohemia: Ottendorf. France: Lodève, near Montpellier, Dépt. de l'Herault. Germany: Salhausen, near Ostharz. Moravia: Rossitz.

Walchia hypnoides, Brongniart, sp.

Walchia hypnoides.
Brongniart, Tabl. d. Genres de Végét. Foss. pp. 71, 100.
Göppert, Foss. Flora d. Perm. Form. p. 235 (foot note).

* In Explication de la Carte Géologique de la France; Tome 4, pt. 2, 1879, 4to.

Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 277.
Zeiller, Végét. Foss. du Terr. Houil. p. 155, pl. clxxvi. fig. 4.*

Fucoides hypnoides.
Brongniart, Hist. d. Végét. Foss. p. 84, pl. ix. *bis*, figs. 1, 2.

Remarks.—Probably this species is only a smaller form of *Walchia piniformis*, Schlotheim sp.
Horizon.—Permian.
Locality.—France : Lodève, near Montpellier, Dépt. de l'Herault.

ULLMANNIA, Göppert, 1850.
Monographie die Fossilen Coniferen, p. 185.

Ullmannia Bronni, Göppert.

Ullmannia Bronni.
Eichwald, Lethæa Rossica, p. 230.
Geinitz, Die Leitpflanzen d. Rothl. p. 22, pl. 1. figs. 5, 6.
„ Dyas, p. 154, pl. xxx, fig. 2*a*, and pl. xxxi, figs. 21–30.
Göppert, Foss. Flora d. Perm. Form. p. 223, pl. xlv. figs. 1–26.
„ Mon. d. Foss. Coniferen, p. 185, pl. xx. figs. 1–26.
Heer, Perm. Pflanzen v. Fünfkirchen, p. 8, pl. xxi. figs. 3–5.
Lesquereux, Bull. Mus. Comparative Zool. Harvard Col. vol. vii. pp. 244 and 245, 1882.
Schimper, Traité d. Palćont. Végét. vol. ii. p. 311.
Weber, Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 315, pl. xiv. figs. 1–5, 1851.

Cupressites Ullmanni.
Brongniart, Prodrome, p. 109.
Bronn, Index Palaeont. p. 362.
„ Leonard's Zeitsch. für Mineral, p. 509, pl. iv. 1828.
Unger, Synop. Plant. Foss. p. 192.

Chamæcyparites Ullmanni.
Endlicher, Synop. Conif. Foss. p. 14.
Unger, Genera et Species, p. 350.

Steinophyllum lanceolatum.
Eichwald, Lethæa Rossica, p. 238, pl. xviii. figs. 6, 7.

Cupressites bituminosus.
Geinitz (*in part*), Vers. d. Zechst. pl. viii. fig. 3.

Cupressites-Blatt.
Geinitz, Vers. d. Zechst. pl. viii. figs. 12, 13.

Caulerpites selaginoides.
Geinitz, Vers. d. Zechst. pl. viii. figs. 9, 10.

Coniferen-Blatt.
Geinitz, Vers. d. Zechst. pl. viii. fig. 11.

Horizon.—Kupferschiefer.
Locality.—Saxony : Trebnitz, near Gera.

Ullmannia lycopodioides, Brongniart, sp.

Ullmannia lycopodioides.
Göppert, Mon. d. Foss. Coniferen, p. 190, pl. xxi. figs. 4–6.
„ Foss. Flora d. Perm. Form. p. 229, pl. xlvi. figs. 4–6.
Schimper, Traité d. Palćont. Végét. vol. ii. p. 312.

* In Explication de la Carte Géologique de la France ; Tome 4, pt. 2, 1879, 4to.

Ullmannia selaginoides.
Geinitz, Die Leitpflanzen d. Rothl. p. 23.
„ Dyas, p. 155, pl. xxxi. figs. 17–20, pl. xxxii.
Weber, Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 318, pl. xiv. fig. 6.

Walchia lycopodioides.
Eichwald, Lethæa Rossica, p. 234.

Caulerpites selaginoides.
Bronn, Index Palæont. p. 251.
Sternberg, Vers. ii. p. 20.
Unger, Genera et Species, p. 3.

Fucoides selaginoides.
Brongniart, Prodrome, p. 21.
„ Hist. d. Végét. Foss. p. 73, pl. ix. fig. 2.

Caulerpa (?) selaginoides.
King, Mon. Perm. Foss. Pal. Soc. p. 3, pl. 1, fig. 3. 1850.

Caulerpites lycopodioides.
Bronn, Index Palæont. p. 251.
Sternberg, Vers. ii. p. 20.

Fucoides lycopodioides.
Brongniart, Prodrome, p. 21.
„ Hist. d. Végét. Foss. p. 72, pl. ix. fig. 3.

Caulerpites intermedius.
Münster, Beitr. z. Petref. heft. v. p. 100, pl. xv. fig. 19.

Caulerpites brevifolius.
Münster, Beitr. z. Petref. heft. v. p. 101, pl. xv. fig. 17.

Caulerpites distans.
Münster, Beitr. z. Petref. heft. v. p. 101, pl. xiv. fig. 1.

Voltzia Phillipsii.
Bronn, Index Palæont. p. 1367.
Lindley and Hutton, Foss. Flora, vol. iii. pl. cxcv.

Araucarites Phillipsii.
Endlicher, Synop. Conif. Foss. 37.

Horizon.—Kupferschiefer.
Localities.—Bavaria: Reichelsdorf, Mansfield. Saxony: Trebnitz, near Gera.

Ullmannia, sp.

Remarks.—A few indistinct impressions, which may probably belong to *Ullmannia lycopodioides*, Brongt. sp.
Horizon.—Permian.
Locality.—British: Durham, Thickley.

VOLTZIA, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 108.

Voltzia hexagona, Bischoff sp.

Voltzia hexagona.
Geinitz, Dyas, p. 156, pl. xxx, figs. 3–5.
Göppert, Foss. Flora d. Perm. Form. p. 233.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 570.

Lycopodites hexagonus.
Bronn, Index Palæont. p. 681.
Unger, Synop. Plant. Foss. p. 143.
„ Genera et Species, p. 275.

Lycopodiolites hexagonus.
Bischoff, Leonard's Zeitsch. für Mineral. p. 255, 1828.

Ullmannia longifolia.
Geinitz, Dyas, pl. xxx. figs. 3–5.
Horizon.—Permian : Todliegende.
Locality.—Bavaria : Spessart, near Aschaffenburg.

Voltzia (?) Liebeana, Genitz sp.

Cyclopteris Liebeana.
Geinitz, Dyas, p. 140, pl. xxvi. figs. 4–6.
Göppert, Foss. Flora d. Perm. Form. p. 117.
Schimper, Traité d. Paléont. Végét. vol. 1, p. 422.

Remarks.—These curious fossils appear to belong to the Coniferæ, and not to *Cyclopteris*. In all probability they are the bracts of a Voltzia cone.
Horizon.—Kupferschiefer.
Locality.—Saxony : Trebnitz, near Gera.

PICEITES, Göppert, 1850.

Monographie der Fossilen Coniferen, p. 208.

Piceites orobiformis, Schlotheim sp.

Pixeites orobiformis.
Geinitz, Dyas, p. 157, pl. xxxiii. figs. 2, 2 *a* (? fig. 3).

Pinites orobiformis.
Geinitz, Die Leitpflanzen d. Rothl. p. 24.

Cupressites pectinatus.
Geinitz, Vers. d. Deutsch. Zechstein, p. 20.

Caulerpites pectinatus.
Sternberg, Vers. ii. p. 21.

Fucoides pectinatus.
Brongniart, Hist. d. Végét. Foss. p. 80.

Algacites orobiformis.
Schlotheim, Nachtr. z. Petrefactenk. p. 43.

Carpolithes orobiformis.
Schlotheim, Petrefactenkunde, p. 419, pl. xxvii. fig. 2.

Horizon.—Kupferschiefer.
Locality.—Saxony : Trebnitz, near Gera.

ARAUCAROXYLON, Kraus, 1870.

Kraus, in Schimper's Traité de Paléont. Végétale, vol. ii. part i. p. 380.

Araucaroxylon saxonicum, Geinitz sp.

Araucaroxylon saxonicum.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 383.
Sterzel, Foss. Pflanzen d. Rothl. v. Chemnitz, p. 228.

Araucarites saxonicus.
Geinitz, Die Leitpflanzen d. Rothl. p. 25.
„ Dyas, p. 169.
Göppert, Foss. Flora d. Perm. Form. p. 251, pls. liv. lv. lvi. figs. 2–4, and pl. lx. figs. 1, 2.

Calamitea concentrica.
Cotta, Dendrolithen, p. 72, pl. xvi. figs. 2–5.

Calamites concentricus.
Sternberg, Vers. ii. p. 51.

Calamodendron concentricum.
Geinitz, Dyas, p. 36.

Remarks.—Portions of the specimens figured as *Calamitea concentrica* by Cotta on pl. xvi. figs. 4 & 6 of his 'Dendrolithen' are in the Collection.
Horizon.—Rothliegende.
Locality.—Saxony : Chemnitz.

CARBONIFEROUS.

CARBONIFEROUS.

ALGÆ.

CONFERVITES, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, pp. 13 and 211.

Confervites acicularis, Göppert.

Confervites acicularis.

Göppert, Flora d. Sil. Devon. u. Unter. Kohl. p. 436.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 186.
„ Foss. Flora d. Ubergangs. p. 80, pl. xli. fig. 3.
Sandberger, Vers. d. Rheinischen Schichten. p. 422, pl. xxxviii. fig. 3.
Schimper, Traité d. Paléont. Végét. vol. i. p. 156.

Remarks.—This species, which was described by Göppert from the Devonian Formation of Nassau, was not thought by Schimper to have much resemblance to a *Conferva.** The specimens from Glencartholm, which I identify as Göppert's plant, are undoubtedly of organic origin, and although it is impossible to affirm that they possess any relationship to the recent *Conferva*, I believe them to be algoidal in their nature. Only two specimens are in the Collection. In one, which occurs on a slab associated with *Chondrites plumosa*, Kidst., the filaments are bent over each other and matted together, but in the other specimen the filaments are only slightly curved, apparently simple and delicate, their thickness varying somewhat, but their greatest width is only about 1-25 of an inch.

Horizon.—Cement-stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

CHONDRITES, Sternberg, 1838.

Versuch einer Geognostisch Botanischen Darstellung. der Flora der Vorwelt, ii. p. 25.

Chrondrites plumosa, Kidston.

Chondrites plumosa.

Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 532, pl. xxx. fig. 3, and pl. xxxii, fig. 2.
Kidston, Proc. Roy. Soc. Edinb. Session 1881–2, p. 603.

Horizon.—Cement-stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

Chondrites simplex, Kidston.

Chondrites simplex.

Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 533, pl. xxxi, fig. 14.
„ Proceed. Roy. Soc. Edinb. Session 1881–2, p. 603.

Horizon.—Cement-stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

* Schimper, *loc. cit.*, vol. i. p. 156.

BYTHOTREPHIS, Hall, 1847.

Palæontol. New York, vol. i. p. 8.

Bythotrephis Scotica, Kidston, sp. nov.

Bythotrephis, sp.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 534, woodcut.

Description.—Frond frequently dichotomising, filaments contracted at the point of dichotomy.

Remarks.—When writing my report on the fossil plants collected by the Geological Survey of Scotland in Eskdale and Liddesdale,* the examples of this alga at my disposal were not sufficiently perfect to justify me in applying to them a specific determination.

From specimens of this plant lately acquired for the Geological Department, I am now enabled to supplement my original description.

Two of these examples are particularly good. The larger most probably represents a portion of a frond from near the base. All the filaments are broken, and the lower part of the fossil also appears to be incomplete. This specimen, which is fully six inches long, illustrates well the dichotomous division of the frond. The lower part of the fossil is half an inch broad, but about three-quarters of an inch from its base it swells out considerably, and is here 9-10ths of an inch wide, but this width most probably represents the measurement of two contiguous filaments, and though the fossil does not here show any line of division, in all likelihood the separation of the filaments extended further down, but from their close proximity the line of separation has been obliterated through pressure.

These branchlets again dichotomise, the segments becoming more narrow, till at their upper extremity, where they are broken over, they are only one-fifth of an inch broad.

In the other example, which is only $2\frac{1}{2}$ inches long, the length of the branchlets between the bifurcations is not so great as in the previous example, and it is most likely a portion of the frond nearer the apex.

Immediately above its base it divides into two branches, each of which again dichotomises. These attain rather more than an inch in length, and give rise to a third set of dichotomous filaments. The branchlets which arise from a dichotomy are slightly contracted at their base, and the summit of the filament from which they spring is also constricted. In no case have I been successful in observing the termination of a filament, but from the manner in which they regularly decrease in width there is probably only a very small portion of the upper part of the smaller specimen wanting.

As the filaments are frequently bent over each other, the alga has evidently been flaccid.

The fossils are represented on the matrix by a well-defined carbonaceous stain, and from the quantity of carbonaceous matter adhering to them here and there, the plant must have originally possessed considerable consistency.

Horizon.—Cement-stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

EQUISETACEÆ.

CALAMITES, Suckow, 1784.

Act. Acad. Theod. Palat. vol. v. p. 359 (fide Unger).

Different opinions are held by some authors as to the structure of the outer surface of the bark of *Calamites*, whether it was smooth or furrowed. Almost all Continental Botanists accept the latter view, but some British

* Trans. Roy. Soc. Edinb. vol. xxx.

writers have stated their belief in the former opinion. This subject I would willingly have left alone, nor can I in a work of this nature enter fully into the merits of the case, but may be allowed to state briefly the reasons why I have adopted the view that the bark of *Calamites* was furrowed on its outer aspect, in preference to the opinion that it was smooth. It has also been stated that the specimens of *Calamites* as ordinarily found are casts of the pith cavity, and that their furrowed surfaces are merely the impress of the inner angles of the vascular cylinder, which, from its more durable texture, was able to resist the decay longer than the delicate pith, which soon disappeared, its place being filled with sediment. Pressure then acting on the vascular cylinder caused the cast of the pith cavity to assume the furrowed appearance. That such specimens do occur there is little reason to doubt, but it appears to me to be equally clear that all furrowed specimens of *Calamites* are not internal casts of the pith cavity. On large stems we need scarcely expect to find the leaves attached, as probably in the course of nature they were shed before the stems were imbedded, but small branches, with the foliage still in position, are by no means uncommon, and on these, when at all well preserved, the furrows are distinctly seen. Hence it is evident that furrowed stems are not all internal casts of the pith cavity.

The following plates bear out these remarks :—

Lebour, Illustrations of Fossil Plants, pl. iii. *Calamites nodosus.*
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. pl. xii. fig. 1, *Asterophyllites rigidus.*
„ Steinkohlen-Calamarien, pl. ix. figs. 1, 2, *Cingularia typica.*
„ „ „ pl. xi. *Asterophyllites capillaceus.*
„ „ „ pl. xv. *Palæostachya elongata.*
Ettingshausen, Die Steinkohlenf. v. Radnitz, pl. vi. *Calamites communis.*
Schimper (after Germar), Traité Paléont. Végét. Atlas, pl. xxii. figs. 1-3, *Calamocladus equisetiformis.*

Again, if we regard them as casts, how are we to explain the large branch scars on *Calamites ramosus?* It seems most improbable that these large scars were caused by some structure jutting into the pith cavity ; and further, specimens showing the branch attached to the scar are by no means unknown. These arguments prove, I think, that *Calamites* as they usually occur are not all internal casts. The small tubercles at the top of the furrows are also, I believe, the scar left by the fallen leaf. This is clearly indicated by :—

Ettingshausen, Steinkohlenf. v. Radnitz, pl. i. fig. 5, *Calamites communis.*
Weiss, Steinkohlen-Calamarien, pl. xvii. *Calamitina Göpperti.*

Then grant, for the sake of argument, that the carbonaceous layer commonly coating the outside of *Calamites*, as these usually occur, represents the vascular system and bark, the next point to be considered is whether the furrows have been imparted to a smooth bark by the external rounded surfaces of the vascular wedges, from the pressure exerted during mineralization, or whether the furrows are a natural character of the external surface of the stems. This question is more difficult to decide. Any specimens that have been figured showing the structure of the bark do not appear to have been sufficiently well-preserved to settle this point. With all respect to the opinion of those authors who have stated that *Calamites* had a smooth external bark, I think that the complete proof of the statement has not yet been given. In any figures that I have seen where the bark has been preserved, the flexuous outline they show appears to point more strongly to its having been fluted than smooth. Stems of *Calamites* also occur, which have not been in any way destroyed by pressure, in so far as they still retain the round form of the stem and on these, too, we find the characteristic furrows. The view which I am at present inclined to adopt, and the one

which seems most supported by evidence, points to the Calamite stem having been furrowed on its outer aspect; the bark being thin, and following the contour of the vascular wedges, though probably the intervals between the furrows on a corticated specimen would be less distinct than on a decorticated example, nevertheless the furrows were distinctly shown, as we find in fact on the outer surface of the stems of recent *Equisetum*.

Calamites Suckowii, Brongniart.

Calamites Suckowii.

Andrae, Neues Jahrbuch, 1864, p. 164.
„ Jahrb. d. Naturwiss. Vereines, Halle, p. 119, 1850.
Boulay, Recherches de Paléont. Végét. p. 7, 1880.
„ Terr. Houil. du Nord de la France, p. 21.
Brongniart, Prodrome, p. 37.
„ Hist. d. Végét. Foss. p. 124, pl. xiv. fig. 6, pl. xv. figs. 1–6, pl. xvi. figs. 2, 3, 4 (1 ?).
Bronn. Index Palæont. p. 199.
„ Lethæa Geog. vol. i. pt. ii. p. 101.
Dawson, Acadian Geol. 2nd ed. p. 478, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 151.
„ Canadian Nat. vol. viii. p. 439.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants of Lower Carb., Canada, p. 38.
Eichwald, Lethæa Rossica, vol. i. p. 170.
Feistmantel, O, Zeitsch. d. Deut. Geol. Gesell. vol. xxv, pp. 594 & 597.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 294, 298, 300, & 303.
„ Vers. d. Böhm. Kohlenabl. p. 102, pl. ii. figs. 3, 4, pl. iii. figs. 1, 2, pl. iv. figs. 1, 2, pl. v. & pl. vi. fig. 1 (excl. as fruit, *H. carinata*).
„ Steinkohl. u. Perm-Ablager. p. 66 (? excl. syn. *C. Steinhaueri*).
„ Steinkf. v. Kralup in Böhmen, p. 9.
„ K, Der Hangendflötzzug, p. 63.
Fontaine & White, Perm. or Upper Carb. Flora, pp. 17 & 35.
Geinitz, Neues Jahrbuch, 1867, pp. 274 & 284.
„ Vers. d. Steinkf. in Sachsen, p. 6, pl. xiii. figs. 1–6.
„ Gaea v. Sachsen, p. 67.
Giebel, Deutschl. Petrefacten, p. 21.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 1.
Göppert, Foss. Flora d. Perm. Form. p. 34 (pl. 1, figs. 3, 4 ?).
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 14, pl. 1, figs. 1–6.
Gutbier, Vers. d. Zwick. Schwarzkohl. p. 17, pl. ii. figs. 1, 2.
Heer, Flora Foss. Helv. lief. i. p. 46 (*in part*).
Lesquereux, Coal Flora in Pennsyl. p. 20, pl. 1 figs. 3, 4.
„ Geol. of Pennsyl. vol. ii. p. 850.
„ Report Geol. Survey Illinois, vol. ii. p. 445.
Newberry, Annal. and Mag. Nat. Hist. 1883, vol. xii. p. 173.
Renault, Cours d. Bot. Foss. p. 159, pl. xxiv. figs. 3 & 5, 1882.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 9, pl. i. fig. 6, pl. ii. fig. 2.
Römer, Palaeontographica, vol. ix. p. 19, 1862.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarz. p. 5.
Schimper, Traité d. Paléont. Végét. vol. i. p. 312 (pl. xviii. fig. 1 ?).
Sternberg, Vers. ii. p. 49.
Stur, Verh. d. k. k. Geol. Reichsanst. p. 303, 1874.
Unger, Synop. Plant. Foss. p. 21.
„ Genera et Species, p. 44.
„ Anthracit-Lager in Kärnthen, p. 782.

Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 84.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 117.
„ Steinkohlen-Calamarien, p. 123, pl. xix. fig. 1.
Zeiller, Végét. Foss. du Terr. Houil. p. 12, pl. clix. fig. 1.
„ Flore Houil. des Asturies, p. 3.

Calamites decoratus.
Artis, Antedil. Phytol. pl. xxiv.
Brongniart, Prodrome, p. 37.
„ Hist. d. Végét. Foss. p. 123, pl. xiv. figs. 1–5.
„ Class. d. Végét. Foss. p. 9, pl. i. fig. 2.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 74.
Geinitz, Gaea v. Sachsen, p. 67.
Giebel, Deutschl. Petrefacten, p. 21.
Kimball, Flora from the Appalachian Coal Field, p. 8.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 849.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 9.
Sternberg, Vers. ii. p. 49.
Unger, Synop. Plant. Foss. p. 21.
„ Genera et Species, p. 44.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 84.

Calamites æqualis.
Bronn, Index Palæont. p. 198.
Sternberg, Vers. ii. p. 49.

Calamites communis.
Ettingshausen, (*in part*), Steinkf. v. Radnitz* p. 24, pl. iii. figs. 1 & 3, pl. iv. figs. 1–3, pl. ix. fig. 1.
„ (*in part*), Haidinger's Naturwiss. Abhandl. vol. iv. Abth. I. p. 73.

Calamites communis, var *Suckowii.*
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.

Calamites cannæformis.
Lebour, Illustrations of Fossil Plants, pl. i.
Roehl, Foss. Flora d. Steink. Form. Westphalens, pl. ii. fig. 3.

? Bambusoides abnormis.
König, Icones Fossilium Sectiles, pl. xvi. fig. 198.

Calamites (the base of a stem).
Lindley & Hutton, Foss. Flora, vol. ii. pl. xcvi.

Remarks.—It is very difficult to decide as to the species with which Brongniart's *Calamites undulatus* (Sternberg), Brongt. (Hist. d. Végét. Foss. p. 127, pl. xvii. figs. 1–4), should be united. As the flexuous character of the furrows has been imparted by pressure, any species of Calamite may, from the same cause, have the furrows bent in a flexuous manner. Some authors have united these figures with *Calamites cannæformis*, others with *C. Suckowii*, but the evidence afforded by them is too imperfect for a satisfactory decision on this point.

The specimen figured by Roehl as *Calamites cannæformis*† appears to belong to *C. Suckowii.*

Crépin‡ has pointed out that the furrows on the stems of *Calamites Suckowii* and *C. Cistii* do not always alternate at the nodes, but occasionally run continously from one internode to another, as in *Bornia radiata.*

* Abhand. k. k. Geol. Reich. Wien, Bd. ii. abth. 3. No. 3.

† *Loc. cit.*, pl. ii., fig. 3.

‡ Notes Paléophytologiques, Bull. Soc. Roy. Bot. Belg. vol. xix. 2e partie, (Observations sur les Cotes des Calamites).

Germar previously called attention to a similar occurrence in *C. alternans.** This peculiarity is seen in some of the specimens of *C. Suckowii* in the Collection. In one example six furrows occupy the space of seven furrows in the next succeeding internode, and I have several times met with such specimens.

The explanation of this local disarrangement of the furrows on Calamite stems seems to be clearly indicated by Prof. Williamson in his paper "On the Organization of the Fossil Plants of the Coal Measures.—Part I. *Calamites*,"† where he says: "Indications of wedges intercalated after the first growth had begun have only been met with in one example, in which a solitary wedge first appears at a point a little external to the concentric line formed by the inner angles of the rest of the series, and it was devoid of the usual accompanying longitudinal canal."‡

If, then, in any internode an additional vascular wedge is added, it must of necessity cause a local disarrangement of the furrows, which will be shown by their not holding their normal alternate position to the furrows of the succeeding joint.

The specimen figured by Schimper as *Calamites Suckowii* §, I am inclined to regard as belonging to *Calamites cannæformis* rather than to *Calamites Suckowii*.

Horizon.—Coal Measures.

Localities.—British. Derbyshire: Riddings (Presented by F. Seymour Haden, Esq.). Devonshire: Bideford (Presented by Rev. W. Bilton). Durham: Jarrow Colliery. Lanarkshire: Carluke (Presented by the British Association); Chapelhall, Airdrie; Dalmarnock; Shotts (Presented by the British Association). Northumberland: Newcastle-on-Tyne. Shropshire: Coalbrook Dale. Staffordshire: Parkfield, near Wolverhampton. Worcestershire: Bewdley, Forest of Wyre. Yorkshire: Leeds. Wales, S.: Ebbw Vale, near Merthyr Tydvil.

Foreign. Bohemia: Radnitz. Rhenish Prussia, Saarbruck. Russia, near Kosloo, Black Sea (Presented by Capt. Spratt, R.N.). Saxony: Hainichen; Zwickau.

Calamites ramosus, Artis.

Calamites ramosus.

Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 119.
Artis, Antedil. Phytol. pl. ii.
Boulay, Recherches de Paléont. Végét. p. 8, 1880.
Brongniart, Hist. d. Végét. Foss. p. 127, pl. xvii. figs. 5, 6.
„ Prodome, p. 37.
Bronn, Index Palæont. p. 199.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 433, 1847.
Dawson, Acadian Geol. 2nd edit. p. 478, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 151.
„ Canadian Nat. vol. viii. p. 439.
„ Foss. Plants of Lower Carb., Canada, p. 36.
Eichwald, Lethæa Rossica, vol. i. p. 165.
Fontaine & White, Perm. or Upper Carb. Flora, p. 17.
Giebel, Deutschl. Petrefacten, p. 21.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 20, pl. ii. fig. 4.
Gutbier, Vers. d. Zwick. Schwarzkohl. p. 18, pl. ii. fig. 6.

* Isis, p. 273, 1838.
† Phil. Trans. 1871.
‡ *Loc. cit.* p. 481.
§ Traité Pal. Vég. pl. xviii. fig. 1.

Lesquereux, Coal Flora in Pennsyl. p. 22, pl. i. fig. 2.
„ Geol. of Pennsyl. vol. ii. p. 850.
„ Report Geol. Survey of Illinois, vol. ii. p. 445.
Renault, Cours d. Botan. Foss. p. 163, pl. xxiv. fig. 8, 1882.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 10, pl. i. figs. 3, 4.
Stur, Culm Flora, heft ii. p. 213.
Unger, Synop. Plant. Foss. p. 21.
„ Genera et Species, p. 45.
Zeiller, Végét. Foss. du Terr. Houil. p. 15.

Calamites nodosus.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 120.
Brongniart, Prodrome, p. 38.
(!) „ Hist. d. Végét. Foss. p. 133, pl. xxiii. figs. 2–4.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86.
Dawson, Acadian Geol. 2nd edit. p. 479, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 151.
„ Canadian Nat. vol. viii. p. 440.
„ Foss. Plants of Lower Carb., Canada, p. 36.
Eichwald, Lethæa Rossica, vol. i. p. 163.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 77.
Fontaine & White, Perm. or Upper Carb. Flora, p. 17.
Geinitz, Flora d. Hainich.-Ebersdorfer, pp. 23, 34.
Giebel, Deutschl. Petrefacten, p. 22.
Lebour, Illustrations of Foss. Plants, p. 3, pl. ii. p. 7, pl. iii. (*Annularia radiata* ? Brongt.).
Lindley & Hutton, Foss. Flora, vol. i. pls. xv. xvi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Portlock, Report Geol. of Londonderry, p. 627.
Sternberg, Vers. i. fasc. 2, pp. 27 & 32, pl. xvii. fig. 2 ; fasc. 4, pl. xxvii.; ii. p. 48 (non Schloth.).
Unger, Synop. Plant. Foss. p. 22.
„ Genera et Species, p. 47.

Calamites communis.
Ettingshausen (*in part*), Steinkf. v. Radnitz, p. 24, pl. iii. fig 2, pl. iv. fig. 4.
„ (*in part*), Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 73.

Calamites communis var. *ramosus.*
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.

Calamites carinatus.
Sternberg, Vers. i. fasc. 3, pp. 36 & 39, pl. xxxii. fig. 1 ; fasc. 4, p. xxvii.

Calamites cannæformis.
? Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, pl. xiii. fig. 8 ; pl. xiv. fig. 5.
? „ (*in part*), Flora d. Hainich.-Ebersdorfer, p. 32, pl. xiv. figs. 17, 18.
Roehl (*in part*), Foss. Flora d. Steink. Form. Westph. pl. i. fig. 5 ; pl. xxii. fig. 1.

? Volkmannia pseudosessilis.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 43, pl. vi. fig. 3.

(*?*) *Volkmannia tenera.*
Weiss, Steinkohlen-Calamarien, p. 113, pl. xii. figs. 1*c*, 2.

Remarks.—Many authors have united this species with *Calamites cannæformis ;* but without expressing any decided opinion as to the validity of this view, I prefer to keep them separate for the present, till more careful examination has been given to the subject.

I have examined the types in the Hutton Collection, from which the

plates xv. & xvi. in Lindley and Hutton's 'Fossil Flora' were drawn. What has been represented by these authors as small branchlets bearing foliage, are cones apparently similar to those described by Grand 'Eury as *Volkmannia pseudosessilis*. This is satisfactory proof as to Grand 'Eury's cones being the fruit of *Calamites ramosus*, Artis.

Volkmannia tenera, Weiss, appears to be the same little cone as that named by Grand 'Eury *Volkmannia pseudosessilis*.

Calamites nodosus, Schlotheim,* which is quite distinct from *C. ramosus*, Artis (*C. nodosus*, Sternb., and L. & H.), may, perhaps, belong to *C. cannæformis*, Schloth.

I am inclined to regard as the foliage of this Calamite, *Annularia radiata*, Brongt. In many cases these two plants are found associated together, and the figure of *C. nodosus* given in the "Illustrations of Fossil Plants," pl. iii., whose identification there seems no room to doubt, bears branchlets with foliage, which are apparently indistinguishable from Brongniart's *Annularia radiata* (*Asterophyllites foliosa*, L. & H.).

For the present, though believing *Annularia radiata* to be the foliage of *C. ramosus*, I have kept them separate till the subject is more carefully investigated.

Horizon.—Coal Measures.

Localities.—*British.* Devonshire: Bideford (Presented by Rev. W. Bilton). Lanarkshire: Carluke. Northumberland: Newcastle-on-Tyne. Somerset: Pensford. Stirlingshire: The Cleuch, Falkirk.

Foreign. Bohemia: Radnitz. Russia: Kosloo, Black Sea (Presented by Capt. Spratt, R.N.).

Calamites cannæformis, Schlotheim.

Calamites cannæformis.

Andrae, Neues Jahrbuch, 1864, p. 164.
„ Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 120.
Brongniart, Prodrome, p. 38.
„ Hist. d. Végét. Foss. p. 131, pl. xxi.
Bronn, Index Palæont. p. 198.
Bunbury, Amer. Jour. of Science, 2nd ser. vol. ii. p. 231, 1846.
Dawson, Acad. Geol. 2nd ed. p. 478, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 151.
„ Canadian Nat. vol. viii. p. 439.
„ Foss. Plants of Lower Carb. Canada, pp. 30 & 36.
Eichwald, Lethæa Rossica, vol. i. p. 169.
„ Urwelt Russlands, heft i. p. 84.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 594 & 597.
„ (*in part*) Vers. d. Böhm. Kohlenabl. p. 109 (? pl. vii. fig. 3, pl. viii. figs. 1, 2).
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 294, & 300.
„ (*in part*) Steinkohl. u. Perm-Ablager. p. 68.
„ Der Hangendflötzzug, p. 65.
Fontaine & White, Perm. or Upper Carb. Flora, p. 20.
Geinitz, Flora d. Hainich.-Ebersdorfer, pp. 17, 23, 32, pl. xiv. figs. 16 & 19 (excl. figs. 17, 18).
„ Jahrb. d. k. k. Geol. Reichsanst. p. 350, 1857.
„ Neues Jahrbuch, 1867, pp. 275 & 284.
„ Vers. d. Steinkf. in Sachsen, p. 5, pl. xiv. figs. 1–4 (excl. fig. 5).
Giebel, Deutshchl. Petrefacten, p. 21.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 2.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 21, pl. iii. figs. 1, 2.

* Petrefactenkunde, p. 401, pl. xx. fig. 3.

Gutbier, Vers. d. Zwick. Schwarzk. p. 22, pl. ii. fig. 7.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 850.
„ Coal Flora in Pennsyl. p. 24, pl. i. fig. 1.
Lindley & Hutton, Foss. Flora, vol. i. pl. lxxix.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. p. 164, 1882.
Roehl (*in part*), Foss. Flora d. Steink. Form Westph. p. 12, pl. i. fig. 2, pl. ii. fig. 1 (pl. x. fig. 3 ?)
Römer, Palæontographica, vol. ix. p. 19, 1862.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarz. p. 3.
Sauveur, Végét. Foss. d. Terr. Houil. de la Belgique, pl. xii. fig. 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 316, pl. xx. fig. 3 (excl. fig. 1).
Schlotheim, Petrefactenkunde, p. 398, pl. xx. fig. 1.
Sternberg, Vers. i. fasc. 4, p. 26; ii. p. 46.
Unger, Synop. Plant. Foss. p. 22.
„ Genera et Species, p. 47.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 84.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 115.
Zeiller, Végét. Foss. du Terr. Houil. p. 16.

Calamites pachyderma.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 120.
Brongniart, Prodrome, p. 38.
„ Hist. d. Végét. Foss. p. 132, pl. xxii.
Bronn, Index Palæont. p. 199.
Giebel, Deutschl. Petrefacten, p. 21.
? Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 23.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 850.
„ Report Geol. Survey of Illinois, vol. ii. p. 445.
„ Coal Flora in Pennsyl. p. 28.
Sternberg, Vers. ii. p. 50.
Unger, Synop. Plant. Foss. p. 22.
„ Genera et Species, p. 47.

Calamites undulatus.
Sternberg, Vers. ii. p. 47, pl. i. fig. 1 (? pl. xx. fig. 8).

Calamites communis.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 73.

Calamites Suckowii var. *cannæformis.*
Heer, Flora Foss. Helv. lief. 1, p. 46.

? Calamites nodosus.
Schlotheim, Petrefactenkunde, p. 401, pl. xx. fig. 3.

? Calamites gigas.
Boulay, Terr. Houil. du Nord de la France, p. 21.

? Calamites sulcatus.
Bronn, Index Palæont. p. 199.
Giebel, Deutschl. Petrefacten, p. 22.
Gutbier, Vers. d. Zwick. Schwarzk. p. 27, pl. ii. fig. 8.
Unger, Genera et Species, p. 51.

Remarks.—A very unsatisfactorily defined species, and in many cases it is extremely difficult to decide as to whether certain specimens should be referred to *Calamites Suckowii* or *Calamites cannæformis.**

Horizon.—Coal Measures.

Localities.—British. Durham: Sunderland. Northumberland: Newcastle-on-Tyne. Staffordshire: Wednesbury. Yorkshire: Bradford.

* See Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 115.

Calamites Cistii, Brongniart.

Calamites Cistii.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 119.
Boulay, Terr. Houil. du Nord de la France, p. 21.
„ Recherches de Paléont. Végét. p. 8, 1880.
Brongniart, Prodrome, p. 38.
„ Hist. d. Végét Foss. p. 129, pl. xx.
Bronn, Index Palæont. p. 198.
Dawson, Acadian Geol. 2nd ed. p. 478, 1868.
„ Geol. Survey Canada, Reports 1874–5, pp. 192 & 196.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 151.
„ Canadian Nat. vol. viii. p. 439.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants of Lower Carb. Canada, p. 29, pl. vii. fig. 65.
Eichwald, Lethæa Rossica, vol. i. p. 171.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 75.
Feistmantel, Steinkf. v. Kralup in Böhmen, pp. 10 & 15.
„ Vers. d. Böhm Kohlenablag. p. 112.
„ Steinkohl. u. Perm-Ablager. p. 67.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 7, pl. xi. figs. 7, 8, pl. xii. figs. 4, 5, pl. xiii. fig. 7.
„ Gaea v. Sachsen, p. 68.
„ Neues Jahrbuch, 1867, p. 275.
Giebel, Deutschl. Petrefacten, p. 21.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 3.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 19, pl. ii. figs. 1–3.
Heer, Flora Foss. Helv. lief. i. p. 46, pl. xx. fig. 3 (? figs. 1, 2, & 4).
Lesquereux, Coal Flora in Pennsyl. p. 27 (? pl. i. fig. 6).
„ Report Geol. Survey of Illinois, vol. ii. p. 445.
„ Geol. of Pennsyl. vol. ii. p. 850.
Renault, Cours d. Botan. Foss. p. 162, pl. xxiv. fig. 7, 1882.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 12.
Römer, Palaeontographica, vol. ix. p. 19, 1862.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarz. pp. 4 & 5.
Sauveur, Végét. Foss. d. Terr. Houil. de la Belgique, pl. viii. fig. 3, pl. ix. fig. 1, pl. xi. figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 313.
Sternberg, Vers. ii. p. 50.
Unger, Synop. Plant. Foss. p. 22.
„ Genera et Species, p. 46.
„ Neues Jahrbuch, 1842, p. 608.
„ Anthracit-Lager in Kärnthen, p. 782.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 84.
Zeiller, Végét. Foss. du Terr. Houil. p. 14.
„ Flore Houil. des Asturies, p. 3.

Calamites tuberculosus.
Bronn, Index Palæont. p. 200.
Gutbier, Vers. d. Zwick. Schwarzk. p. 24, pl. ii. figs. 4 & 14, & pl. iii*a*. fig. 4.
Unger, Genera et Species, p. 52.

Calamites articulatus.
Bronn, Index Palæont. p. 198.
Gutbier, Vers. d. Zwick. Schwarzk. p. 26, pl. iii. figs. 2, 3.
Unger, Genera et Species, p. 52.

Calamites lioderma.
Giebel, Deutschl. Petrefacten, p. 22.

Göppert, Foss. Flora d. Perm. Form. p. 34, pl. iii. fig. 1.
Gutbier, Vers. d. Rothl. in Sachsen, p. 8, pl. i. fig. 5.

Calamites Durrii.
Bronn. Index Palæont. p. 199.
Geinitz, Gaea v. Sachsen, p. 69.
Giebel, Deutschl. Petrefacten, p. 22.
Gutbier, Vers. d. Rothl. in Sachsen, p. 8, pl. i. fig. 6.
Unger, Genera et Species, p. 53.

Calamites tenuifolius.
Ettingshausen (*in part*), Steinkf. v. Radnitz, p. 24, pl. iii. fig. 4.
Schimper, Traité d. Palćont. Végét. vol. i. p. 320.

Calamites Petzholdti.
Bronn, Index Palæont. p. 199.
Geinitz, Gaea v. Sachsen, p. 69.
Unger, Genera et Species, p. 53.

Remarks.—In a specimen in the Collection from Richmond, Virginia, which retains an oval form, and on which the cortical envelope has been converted into coaly matter, the flutings on the outer surface of the stem are shown on the transversely broken surface of the fossil as clearly defined convex furrows.

Horizon.—Coal Measures.

Localities.—*British.* Devonshire: Bideford (Presented by Rev. W. Bilton). Lanarkshire: Carluke; Dalmarnock, near Glasgow. Northumberland: Newcastle-on-Tyne. Staffordshire: Trial Sinking, Sandwell Park, West Bromwich.

Foreign. Bohemia: Radnitz. Saxony: Wettin, near Halle; Zankerode, near Dresden. Spain: near Saredon. United States: Richmond, Virginia.

Calamites varians, Sternberg.

Calamites varians.
Bronn, Index Palæont. p. 200.
Eichwald, Lethæa Rossica, vol. i. p. 172.
Etheridge, Cat. Australian Fossils, p. 30.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. 1. p. 67.
Germar, Vers. v. Wett. u. Löbejun, p. 47, pl. xx.
Giebel, Deutschl. Petrefacten, p. 21.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 14, pl. i. fig. 1.
Sternberg, Vers. ii. p. 50, pl. xii.
Unger, Synop. Plant. Foss. p. 22.
„ Genera et Species, p. 47.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 84.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 113, pl. xiii. figs. 1 (?), 2, and 7.

Calamites communis var. *varians.*
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141 & 142.

Endocalamites varians.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 40.

Calamites dubius.
Artis, Antedil. Phytol. pl. xiii.
Brongniart, Prodrome, p. 38.
„ Hist. d. Végét. Foss. p. 130, pl. xviii. figs. 1–3.
Bronn, Index Palæont. p. 198.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 151.

Dawson, Canadian, Nat. vol. viii. p. 440.
„ Foss. Plants of Lower Carb., Canada, p. 38.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 78.
Giebel, Deutschl. Petrefacten, p. 21.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 850.
Schimper, Traité d. Paléont. Végét. vol. i. p. 313.
Unger, Synop. Plant. Foss. p. 22.
„ Genera et Species, p. 46.

Calamites pseudobambusia.
Artis, Antedil. Phytol. pl. vi.
Sternberg, Vers. i. fasc. 1, pp. 22 & 24, pl. xiii. fig. 3, fasc. 4, p. xxvi.

Calamites alternans.
Bronn, Index Palæont. p. 198.
Germar, Isis, p. 273, pl. iii. fig. 1 (? 2, 3, 4), 1838.
Sternberg, Vers. ii. p. 50.

Calamites approximatus.
Artis, Antedil. Phytol. pl. iv.
Brongniart, Hist. d. Végét, Foss. pl. xv. figs. 7, 8, pl. xxiv. fig. 1.
? Heer, Flora Foss. Helv. lief. i. p. 46, pl. xx. fig. 5.
Lesquereux, Coal Flora in Pennsyl. pl. i. fig. 5.
? Geinitz (*in part*), Vers. d. Steink. in Sachsen, pl. xii. figs. 1, 2.
Sauveur, Végét. Foss. du Terr. Houil. de la Belgique, pl. ii.

? *Calamites elongatus.*
Giebel, Deutschl. Petrefacten, p. 23.
Gutbier, Vers. d. Zwick. Schwarzk. p. 28, pl. iii. *b*, figs. 2, 3.

Calamites varians, var. **cruciatus**, Sternberg, sp.

Calamites cruciatus.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 119.
Brongniart, Prodrome, p. 37.
„ Hist. d. Végét. Foss. p. 128, pl. xix.
Bronn, Index Palæont. p. 198.
Giebel, Deutschl. Petrefacten, p. 21.
Gutbier, Vers. d. Zwick. Schwarzk. p. 19, pl. ii. figs. 9, 10, 12, 13, 15, 16.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 850.
„ Report Geol. Survey of Illinois, vol. ii. p. 445.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 11.
Sternberg, Vers. i. fasc. 4, p. xxvii. pl. xlix, fig. 5, ii. p. 48.
Unger, Synop. Plant. Foss. p. 21.
„ Genera et Species, p. 46.
„ Neues Jahrbuch, p. 608, 1842.

Calamodendron cruciatum.
Zeiller, Végét. Foss. du Terr. Houil. p. 152, pl. clxxiv. fig. 3.

Calamites approximatus.
Geinitz, Vers. d. Steinkf. in Sachsen, pl. xi. figs. 2 and 3.
Lindley & Hutton, Foss. Flora, vol. iii. pl. ccxvi.

Calamites Brongniarti.
Bronn, Index Palæont. p. 198.
Sternberg, Vers. ii. p. 48.
Unger, Synop. Plant. Foss. p. 21.
„ Genera et Species, p. 46.

Calamites alternans.
Germar & Kaulfuss, Verh. d. k. Leop. Carol. Akad. vol. xv. p. 211, pl. lxv. fig. 1.

Calamites nodosus.
Gutbier, Vers. d. Zwick. Schwarzk. p. 23, pl. iii, fig. 1.

Calamites affinis.
Giebel, Deutschl. Petrefacten, p. 22.
Gutbier, Vers. d. Zwick. Schwarzk. p. 27, pl. ii. fig. 11.
Unger, Genera et Species, p. 51.

Calamites infractus.
Bronn, Index Palæont. p. 198.
Geinitz, Gaea v. Sachsen, p. 69.
„ Dyas. p. 134, pl. xxv. figs. 2, 3, 4.
Giebel, Deutschl. Petrefacten, p. 22.
Gutbier, Vers. d. Zwick. Schwarzk. p. 25, pl. iii. figs. 4, 5, 6 (fig. 1 ?).
„ Vers. d. Rothl. in Sachsen, p. 8, pl. i. figs. 1–4.
Unger, Genera et Species, p. 51.

Remarks.—*Calamites approximatus*, L. & H. (vol. iii. pl. ccxvi.) must be referred to the cruciatus-form of *C. varians*, and not to *C. approximatus*. *Calamites approximatus*, Artis (Antedil. Phytol. pl. iv.), and that in Lindley and Hutton's Fossil Flora, (pl. lxxvii.), appear to be the true *C. varians*, Sternberg. I have followed Weiss * in regarding *Calamites cruciatus*, Brongt., as a variety of *Calamites varians*, Sternb., as it must be admitted there are intermediate forms which connect the two plants together. It is quite possible, however, that they may eventually be found to be distinct, as there is some evidence to show that *C. cruciatus*, Brongt., may be only a branched condition of *C. Cistii*. Weiss includes as a form of *C. varians*, *C. approximatus*, Brongt. (Hist. d. Végét. Foss. pl. xxiv. figs. 2–5 [excl. fig. 1], & pl. xv. figs. 7, 8), but I prefer to keep them separate. *C. varians* and *C. cruciatus* are true *Calamites*, whereas *C. approximatus*, Brong., appears to be an internal cast, and possibly not referrable to the genus *Calamites* at all. *C. approximatus*, Feistmantel (Jahrb. d. k. k. Geol. Reichsanstalt, vol. xxii. p. 292, 1872), which is described by the author as "a well preserved example with distinct ribs and tubercles," must be referred to one of the forms of *C. varians*, and is probably comparable to *C. approximatus*, Artis, which is here placed under *C. varians*.

Horizon.—Coal Measures.

Calamites varians, Sternb.

Localities.—*British.* Lanarkshire: Carluke. Northumberland: Felling Colliery, Newcastle-on-Tyne. Worcestershire: near Bewdley. Yorkshire: Gannister Beds., (Presented by the late Sir P. G. Egerton, Bart., Trustee Brit. Mus.)

Var cruciatus, Brongt. sp.

Foreign. Bohemia.

Calamites ? approximatus, Brongniart.

Calamites approximatus.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 119.
Boulay, Terr. Houil. du Nord. de la France, p. 21.
Brongniart (*in part*), Hist. d. Végét. Foss. pl. xxiv. figs. 2, 3, 4, 5.
„ (*in part*), Prodrome, p. 38.
Bronn, Index Palæont. p. 198.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 433, 1847.
Ettingshausen (*in part*), Haidinger's Naturwiss. Abhandl. vol. iv. abth I. p. 79.
Feistmantel (*in part*), Vers. d. Böhm. Kohlenabl. p. 106, pl. vi. fig. 2; pl. vii. figs. 1, 2 (*?*).
„ (*in part*), Steinkohl. u. Perm-Ablager. p. 67.

* Foss. Flora d. jüng. Steink. u. d. Rothl. p. 114.

Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 594, 597.
" (*in part*), Der Hangendflötzzug, p. 64.
Fontaine & White, Perm. or Up. Carb. Flora, p. 17.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, p. 7, pl. xii. fig. 3.
Giebel, Deutschl. Petrefacten, p. 22.
Gutbier, Vers. d. Zwick. Schwarzk. p. 23, pl. ii. fig. 3.
Kimball, Flora from the Appalachian Coal Field, p. 7, 1857.
Lesquereux (*in part*), Coal Flora in Pennsyl. p. 26 (excl. pl. i. fig. 5).
" Geol. of Pennsyl. vol. ii. p. 850.
" Report Geol. of Illinois, vol. ii. p. 445.
Morris, Trans. Geol. Soc. 2nd Ser. vol. v. p. 488.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 14, pl. ii. fig. 7.
Römer, Palaeontographica, vol. ix. p. 19, 1862.
Schimper, Traité d. Paléont. Végét. vol. i. p. 314.
Schlotheim, Petrefactenkunde, p. 399.
Sternberg, Vers. i. fasc. 4, p. xxvi., ii. p. 47.
Unger (*in part*), Synop. Plant. Foss. p. 22.
" (*in part*), Genera et Species, p. 48.

Calamites interruptus.
Schlotheim (*in part*), Petrefactenkunde, p. 400, pl. xx. fig. 2.

Calamodendron approximatum.
Dawson, Acadian Geol. 2nd edit. p. 476, 1868.
" Quart. Journ. Geol. Soc. vol. xxii. p. 149, pl. vii. fig. 31, vol. xxx. p. 216.
" Canadian Nat. vol. viii. p. 437.

Endocalamites approximatus.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, pp. 39 & 47.

Remarks.—See notes to the previous species.
Horizon.—Coal Measures.
Localities.—British. Ayrshire: Stevenston. Shropshire: Coalbrook Dale. Staffordshire: Netherton. Worcestershire: near Dudley.

Calamites, sp.

Remarks.—The plant here included I believe to be a new species, but as the specimen is somewhat fragmentary, it is desirable that additional examples be examined before giving any description.
Horizon.—Coal Measures.
Locality.—British. Stirlingshire: The Cleuch, Falkirk.

Calamites, species.

Remarks.—Transverse and longitudinal sections of stems showing some structural details. The vegetable matter is partly converted into coal in a matrix of white sandstone. The specimens were presented by Dr. Alex. Petzholdt, and are sections of the stems which he has described and figured in his work "Uber Calamiten und Steinkohlenbildung," Dresden, 1841. None of the specimens in the collection show any characters by which a satisfactory specific determination can be made, but Geinitz unites that figured by Petzholdt on his pl. i. to *Calamites Cistii.**

Some of these specimens seem to favour the view that the bark of *Calamites* was furrowed externally.

Horizon.—Coal Measures.
Locality.—Foreign. Saxony: near Dresden.

* Vers. d. Steink. in Sachsen, p. 7.

ASTEROCALAMITES, Schimper, 1862.

Terrain de Transition des Vosges, p. 321.

Asterocalamites scrobiculatus, Schlotheim, sp.

Asterocalamites scrobiculatus.
Zeiller, Végét. Foss. du Terr. Houil. p. 17, pl. clix. fig. 2.

Calamites scrobiculatus.
Schlotheim, Petrefactenkunde, p. 402, pl. xx. fig. 4.

Bornia scrobiculata.
Bronn, Index Palæont. p. 171.
Eichwald, Lethæa Rossica, vol. i. p. 177.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 89.
Giebel, Deutschl. Petrefacten, p. 24.
Göppert, Flora d. Sil. Devon u. unter Kohl. p 472.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 191.
„ Foss. Flora d. Ubergangs. p. 131, pl. x. figs. 1, 2.
„ Neues Jahrbuch, 1847, p. 682.
Ludwig, Palaeontographica, vol. xvii. p. 116, pl. xxi. figs. 1, 2.
Römer, Palaeontographica, vol. iii. p. 45, pl. vii. fig. 5, 1854.
„ Die Vers. d. Harzgebirges, heft i. pl. i. fig. 4, 1843.
Sternberg, Vers. i. fasc. 4, p. xxviii.
Unger, Synop. Plant. Foss. p. 29.
„ Genera et Species, p. 54.

Bornia radiata.
Etheridge, Catal. of Australian Fossils, p. 29.
Kidston, in Cadell, Trans. Edinb. Geol. Soc. vol. iv. p. 334.
„ Annals and Mag. Nat. Hist. p. 313, May, 1883.
Lesquereux, Coal Flora in Pennsyl. p. 30 (? pl. i. fig. 7).
Schimper, Traité d. Paléont. Végét. vol. i. p. 335 ; vol. iii. p. 454 (*synon. in part*).
Schmalhausen, Mélang. Phys. et Chem. vol. x. p. 738, pl. i. figs. 1–3.

Calamites radiatus.
Brongniart, Prodrome, p. 37.
„ Hist. d. Végét. Foss. p. 122, pl. xxvi. figs. 1, 2.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I p. 77.
Heer, Foss. Flora d. Bären Insel, p. 32, pls. i.–iv.
„ Steink. Flora d. Artisch. Zone, p. 4. pl. i. figs. 1–3.
Schimper, Végét. Foss. du Terr. de Trans. d. Vosges, p. 321, pl. i.
Unger, Synop. Plant. Foss. p. 21.
„ Genera et Species, p. 44.

Archæocalamites radiatus.
Peach, Trans. Bot. Soc. Edinb. vol. xiii. p. 46.
Stur, Culm Flora,* heft i. p. 2, pl. i. figs. 3–8 ; pls. ii. iii. iv. v. figs. 1, 2, heft ii. p. 180 ; pl. ii. figs. 1–6 ; pl. iii. figs. 1, 2 ; pl. iv. fig. i ; and pl. v. fig. i.

Calamites transitionis.
Bronn, Index Palæont. p. 199.
Dawson, Acadian Geol. 2nd edit. p. 537, 1868.
? „ Quart. Journ. Geol. Soc. vol. xviii. pp. 298 & 309, 1862.
Eichwald, Lethæa Rossica, vol. i. p. 166, pl. xiii. figs. 1, 2.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 80.
„ Denks. k. Akad. Wiss., vol. xxv. p. 87, pl. i. fig. 4 ; pls. ii. iii. figs. 2–5 ; and pl. iv. figs. 1, 3, 4.
Feistmantel, Zeitschr. d. Deut. Geol. Gesell. vol. xxv. p. 491, pl. xiv. figs. 3, 4.
Geinitz, Die Vers. d. Grauwackenform. part ii. p. 82, pl. xviii. figs. 6, 7.

* Abhandl. k. k. Geol. Reich. Wien, B l. viii. hefts. 1 and 2.

Geinitz, Flora d. Hainich.-Ebersdorfer, p. 30, pl. i. figs. 2–7.
Giebel, Deutschl. Petrefacten, p. 20.
Göppert, Flora d. Sil. Devon u. unter Kohl. p. 465.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 190.
„ Foss. Flora d. Ubergangsgebirges, p. 109, pls. iii. iv. xxxviii.
„ Neues Jahrbuch, 1847, p. 682.
Hall, 16th Annual Report State Cabinet, pp. 104 & 109, 1863.
Ludwig, Palaeontographica, vol. xvii. p. 115, pl. xxi. fig. 4 *a b c d e*.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 15.
Römer, Palaeontographica, vol. iii. p. 45, pl. vii. fig. 4.
„ Geol. v. Oberschlesien, p. 54, pl. iv. figs. 1–3.
Sandberger, Vers. d. Rhein. Sch. in Nassau, p. 426, pl. xxxix. figs. 1 1*a*.
Stur, Verh. d. k. k. Geol. Reichsanst. pp. 295, 296, 1874.
Unger, Synop. Plant. Foss. p. 23.
„ Genera et Species, p. 52.

Bornia transitionis.
Giebel, Deutschl. Petrefacten, p. 24.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 54.
Römer, Palaeontographica, vol. iii. p. 45, pl. vii. fig. 7, 1854.

Calamites laticostatus.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 88, pl. iii. fig. 1.
Römer, Geol. v. Oberschlesien, p. 54.

Bornia laticostata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 336.

Calamites inornatus.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 310, pl. xvii. fig. 56.
Hall, 16th Annual Report State Cabinet, pp. 108, 109, 1863.

Bornia inornata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 336.

Calamites variolatus.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 80.
Göppert, Neues Jahrbuch, 1847, p. 682.
„ Foss. Flora d. Silur. Devon u. unter Kohl. p. 469.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 191.
„ Foss. Flora d. Ubergangsgebirges, p. 124, pl. v.
Unger, Genera et Species, p. 52.

Calamites Sternbergii.
Eichwald, Lethæa Rossica, vol. i. p. 172, pl. xiv. fig. 3.

Calamites tenuissimus.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 92, pl. i. figs. 1, 2.

Calamites obliquus.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 121, pl. vi. figs. 9, 10.

Calamites remotus.
Eichwald, Lethæa Rossica, vol. i. p. 167, pl. xiv. fig. 2.

? Calamites distans.
Römer, Die Vers. d. Harzgebirges, p. 2, pl. i. figs. 5, 6, 1843.

Calamites elegans.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 81.

Calamites cannæformis.
Römer, Die Vers. d. Harzgebirges, p. 2, pl. i. fig. 7.

Bornia Jordaniana.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 132, pl. x. fig. 3.

Equisetites gradatus.
Eichwald, Lethæa Rossica, vol. i. p. 181, pl. xiii. figs. 3, 4.

Equisetites radiatus.
Sternberg, Vers. ii. p. 45.

Stigmatocanna Volkmanniana.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 126, pls. viii. ix.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 191.
„ Flora d. Silur. Devon u. Unter. Kohl. p. 470.

? Anarthrocanna tuberculosa.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 128, pl. vii. figs. 1, 2, 3.

? Anarthrocanna stigmarioides.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 129, pl. xli. fig. 5.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 191.
Sandberger, Vers. d. Rhein. Schich. in Nassau, p. 427, pl. xxxix. fig. 2.

Sphenophyllum furcatum.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 36, pl. i. figs. 10–12 ; pl. ii. figs. 1, 2.
Göppert, Flora d. Sil. Devon u. unter Kohl. p. 474.

Asterophyllum furcatum.
Schimper, Traité d. Paléont. Végét. vol. i. p. 345.

Asterophyllites equisetiformis.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 498, pl. xiv. fig. 6.

Asterophyllites elegans.
Göppert, Neues Jahrbuch, 1847, p. 682.
„ Foss. Flora d. Ubergangsgebirges, p. 133, pl. vi. fig. 11.
„ Flora d. Sil. Devon u. unter. Kohl. p. 473.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 192.
Schimper, Traité d. Paléont. Végét. vol. i. p. 328.
Unger, Genera et Species, p. 67.

Schizopteris lactuca.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 105, fig. 15.

Schizæa transitionis.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 103, pl. vii. fig. 5.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 519, pl. xv. fig. 19.
Römer, Geol. v. Oberschlesien, p. 55.

Fruit of *Asterocalamites scrobiculatus.*

Pothocites Grantoni.
Beyschlag, Neues Jahrbuch, 1884, p. 298.
Carruthers, Geol. Mag. vol. ix. p. 58, 1872.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 548.
„ Annals and Mag. Nat. Hist. vol. xi. 1883, p. 297, pls. ix. x. xi. figs. 9, 10, pl. xii. figs. 13–17.
Paterson, Trans. Bot. Soc. Edinb. vol. i. p. 45, pl. iii. 1841.
Weiss, Neues Jahrbuch, 1884, p. 205.
Williamson, Proc. Roy. Inst. Gt. Brit. vol. x. pt. 2, p. 299. fig. 9, 1883.

Pothocites Patersoni.
Etheridge, Trans. Bot. Soc. Edin. vol. xii. p. 151.
Kidston, Annals and Mag. Nat. Hist. 5th ser. vol. xi. p. 302, pl. x. figs. 6, 7, 8, pl. xi. figs. 9, 10, and pl. xii. fig. 14, 1883.

Pothocites calamitoides.
Kidston, Annals and Mag. Nat. Hist., 5th ser. vol. x. p. 404, 1882 ; p. 305, May, 1883.

Pothocites, sp.
Etheridge, Trans. Bot. Soc. Edinb. vol. xii. p. 162.

Asterophyllites spaniophyllus.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 498, pl. xiv. fig. 5.

Remarks.—*Anarthrocanna tuberculosa*, Göpp., and *Anarthrocanna stigmarioides*, Göpp., are perhaps only different states of preservation of his *Stigmatocanna Volkmanniana*, which has previously been united with *Asterocalamites scrobiculatus*. In my paper (Annals and Mag. of Nat. Hist. *loc. cit.*) I have fully stated the evidence on which I unite *Pothocites Grantoni* with this plant as its fruit.

Horizon.—Calciferous Sandstone Series.

Localities.—*British.* Midlothian: Burdiehouse, near Edinburgh; Redhall, Quarry, near Edinburgh. Northumberland: Cambo Craig Quarry.

Foreign. Saxony: Hainichen (*Horizon.*—Culm).

FRUIT.

British.—Dumfriesshire: Glencartholm, Eskdale.

CALAMOCLADUS, Schimper, 1869.

Traité d. Paléont. Végétale, vol. i. p. 323.

Asterophyllites.
Brongniart, Prodrome d'une Hist. des Végét. Foss. p. 159, 1828.

Calamocladus equisetiformis, Schlotheim, sp.

Calamocladus equisetiformis.
Boulay, Terr. Houil. du Nord de la France, p. 22.
Crépin, Bul. l'Acad. Roy. Belgique, 2e sér. vol. xxxviii. pl. ii. figs. 1–3, 1874. (Fructification.)
Schimper, Traité d. Paléont. Végét. vol. i. p. 324, pl. xxii. figs. 1, 2, 3.

Asterophyllites equisetiformis.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 120.
Brogniart, Prodrome, p. 159.
Bronn, Index Paleont. p. 122.
? Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 71.
Feistmantel, Steinkohl. u. Perm-Ablager. p. 68.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 298, & 300.
„ Steinkohlf. v. Kralup in Böhmen. pp. 10 & 17.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 594 & 597.
„ (*in part ?*) Vers. d. Böhm. Kohlenabl. p. 116, pl. x. figs. 1, 2, pl. xi. pl. xii. fig. 2.
„ Der Hangendflötzzug, p. 66.
Fontaine & White, Perm. or Up. Carb. Flora, p. 17.
Geinitz, Gaea v. Sachsen, p. 70.
„ Vers. d. Steinkf. in Sachsen, p. 8, pl. xvii. figs. 1–3.
Germar, Vers. v. Wett. u. Löbejun, p. 21, pl. viii.
„ Isis, 1837, p. 428, pl. iii. fig. 3, p. 429, pl. ii. fig. 3.
Giebel, Deutschl. Petrefacten, p. 28.
Göppert, Foss. Flora d. Perm. Form. p. 36, pl. 1, fig. 5.
Grand 'Eury, Flore Carb. du Dép. de la Loire, p. 38.
Heer, Urwelt d. Schweiz, p. 8, fig. 4 *c*.
„ Foss. Flora Helv. lief. i. p. 49, pl. xix. figs. 1, 2.
Kimball, Flora from Appalachian Coal Field, p. 9, 1857.
Lesquereux, Coal Flora in Pennsyl. p. 35, pl. ii. fig. 3 (excl. pl. iii. figs. 5–7.)

Lesquereux, Geol. of Pennsyl. vol. ii. p. 851.
„ Report Geol. Survey of Illinois, vol. ii. p. 444.
Renault, Ann. d. Sci. Nat. 6e sér. vol. ii. p. 18, pl iv. figs. 14–18.
„ Cours. d. Botan. Foss. p. 112, pl. xviii. fig. 1, 1882.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 22, pl. iii. fig. 5.
Sandberger, Flora d. Ober Steinkf. im Bädischen Schwarz. p. 2.
Stur, Verh. d. k. k. Geol. Reichsanst. 1874, pp. 268 & 303 ; 1884, p. 138.
Unger, Neues Jahrbuch, 1842, p. 608.
„ Synop. Plant. Foss. p. 31.
„ Genera et Species, p. 64.
Weiss, Verhandl. Natur. Vereines Preuss. Rheinl. Westph. 1868, p. 85.
„ Flora d. jüng. Steink. u. d. Rothl. p. 126.
Zeiller, Végét. Foss. du Terr. Houil. p. 19, pl. clix. fig. 3.
„ Flore Houil. des Asturies, p. 3.

Hippurites longifolia.
Eichwald, Lethæa Rossica, vol. i. p. 191, pl. xiv. fig. 6 (fig. 5 ?).
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 88.
Grand 'Eury, Comptes Rendus, vol. lxviii. p. 709, 1869.
Lindley & Hutton, Foss. Flora, vol. iii. pls. cxc. & cxci.
Unger, Synop. Plant. Foss. p. 35.

Casuarinites equisetiformis.
Schlotheim, Flora d. Vorwelt, p. 30, pl. i. figs 1, 2, pl. ii. fig. 3.
„ Petrefactenkunde, p. 397.

Bornia equisetiformis.
Sternberg, Vers. i. Fasc. 4, p. xxviii.

Calamites equisetiformis.
Ettingshausen, Steinkf. v. Radnitz, p. 28.

Calamites interruptus.
Schlotheim (*in part*), Flora d. Vorwelt, p. 30, pl. i. fig. 2.
„ Petrefactenkunde, p. 400.

Calamites Cistii.
Ettingshausen (*in part*), Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 75, 1851.
Heer, Urwelt d. Schweiz, p. 8, fig. 4 *c*.

Bruckmannia tenuifolia, var. *β*.
Sternberg, Vers. i. fasc. 4, p. 29.

Annularia calamitoides.
Lesquereux, Coal Flora in Pennsyl. p. 48.
Schimper, Traité d. Paléont. Végét. vol. i. p. 349, pl. xxvi. fig. 1.

Asterophyllites trinervis.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 152, pl. xiii. fig. 90.

Asterophyllites Lindleyanus.
Bronn, Index Palæont. p. 122.

Asterophyllites grandis.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, pl. xvii. fig. 5.

Asterophyllites rigidus.
Heer, Foss. Flora Helv. lief. i. p. 49, pl. xviii. fig. 1.

? Calamocladus binervis.
Boulay, Terr. Houil. d. Nord de la France, p. 22, pl. ii. fig. 1.

Remarks.—Schimper is mistaken in uniting *Hippurites longifolia*, Lind. and Hutt. Foss. Flora (pl. cxc.), with *Bornia radiata*, as its root portion.* Both plates cxc. and cxci. are taken from the same specimen, the latter

* Traité, vol. iii. p. 455.

of which Schimper correctly unites with *Calamocladus equisetiformis*. The variety of *Calamocladus* (*Asterophyllites*) *equisetiformis* figured by Germar (Isis, p. 428, pl. ii., fig. 3, 1837), seems identical with the figure of *Bechera grandis*, given by Sternberg (Vers. pl. xlix. fig. 1). I think it extremely probable that under *Bechera grandis* there is included only the smaller branchlets of *Calamocladus equisetiformis*. In the figures of the latter plant given by Germar (Vers. v. Wettin u. Löbejun, pl. viii.), we see some small branchlets which, if separated from their parent stem, are indistinguishable from some of the figures which are placed under *Calamocladus grandis*. In the meantime, however, I have treated *Calamocladus equisetiformis* and *Calamocladus grandis* as distinct. *Calamocladus* (*Asterophyllites*) *rigidus* is also, perhaps, only the larger stems of *Calamocladus equisetiformis*. On some very fine examples of this last-mentioned plant, from the Radstock Coal Field, in the collections of the Bath Royal Literary and Scientific Institution, and Mr. J. McMurtrie, F.G.S., of Radstock, the leaves on the stem which supports the lateral foliage branchlets, in their form and arrangement, appear indistinguishable from figures of *Calamocladus rigidus*. Some specimens similar in character to those mentioned above have been figured by several authors, and one might almost name the lateral branchlets *Calamocladus equisetiformis*, and their supporting stem *Calamocladus rigidus*.

Horizon.—Coal Measures.

Localities.—*British.* Staffordshire : Himley. Shropshire : Coalbrook Dale. Somersetshire : Paulton. Worcestershire : Forest of Wyre.

Foreign. Bavaria. Bohemia : Kammerberg. Moravia : Rossitz. Saxony : Manebach, near Ilmenau ; Wettin, near Halle ; Zwickau. Silesia : Waldenburg. Switzerland : Anterne ; Chamounix (Presented by Alfred Wills, Esq.).

Calamocladus grandis, Sternberg, sp.

Calamocladus grandis.
Schimper, Traité d. Paléont. Végét. vol. i. p. 325.

Asterophyllites grandis.
Bronn, Index Palæont. p. 122.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 118, pl. xii. fig. 4, pl. xiii. fig. 3.
„ Steinkohl u. Perm-Ablager. p. 69.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 8, pl. xvii. fig. 4 (5 ?).
„ Flora d. Hainich.-Ebersdorfer, pp. 17, 23, & 35 (pl xiv. fig. 15 ?).
Giebel, Deutschl. Petrefacten, p. 28.
Grand 'Eury, Flore Carb. du Dép. de la Loire, p. 41.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 424.
„ Coal Flora in Pennsyl. p. 41 (*syn. in part*).
? Lindley & Hutton, Foss. Flora, vol. i. pls. xvii. xix. fig. 2.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 23.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141 & 142.
Unger, Synop. Plant. Foss. p. 33.
„ Genera et Species, p. 64.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 127.

Calamites grandis.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 77.

Bechera grandis.
Bunbury, Quart. Geol. Jour. vol. iii. p. 434, 1847.
Lindley & Hutton, Foss. Flora, vol. i. pl. xix. fig. 1, vol. iii. pl. clxxiii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Sternberg, Vers. i. fasc. 4, p. xxx. pl. xlix. fig. 1.

Asterophyllites delicatula.
Brongniart, Prodrome, p. 159.
Bronn, Index Palæont. p. 122.
Giebel, Deutschl. Petrefacten, p. 28.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 26, pl. ii. fig. 6. pl. iii. fig. 1 *a*, *b*, *c*, fig. 2 *a*, *b*, *c*, pl. iv. fig. 1 *c*, *d*.
Unger, Synop. Plant. Foss. p. 33.
„ Genera et Species, p. 67.

Bechera delicatula.
Sternberg, Vers. i. fasc. 4, p. 31, pl. xix. fig. 2.

Asterophyllites charæformis.
Bronn, Index Palæont. p. 122.
Giebel, Deutschl. Patrefacten, p. 29.
Unger, Synop. Plant. Foss. p. 33.
„ Genera et Species, p. 66.

Bechera charæformis.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Sternberg, Vers. i. fasc. 4, p. xxx. pl. lv. figs. 3, 5.

Asterophyllites dubia.
Brongniart, Prodrome, p. 159.
Bronn, Index Palæont. p. 122.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 64.

Asterophyllites diffusa.
Brongniart, Prodrome, p. 159.
Bronn, Index Palæont. p. 122.
Giebel, Deutschl. Petrefacten, p. 28.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 64.

Bechera diffusa.
Sternberg, Vers. i. fasc. 4, p. 30, pl. xix. fig. 3.

Calamites cannæformis.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, pl. xiv. fig. 5.

Asterophyllites sp.
Lebour, Illustrations of Fossil Plants, p. 9, pl. iv.

Remarks.—For notes, see the previous species.
Horizon.—Coal Measures.
Localities.—*British.* Shropshire : Coalbrook Dale.
Foreign. Bohemia.

Calamocladus longifolius, Brongniart, sp.

Calamocladus longifolius.
Boulay, Terr. Houil. du Nord de la France, p. 22.
Schimper, Traité d. Paléont. Végét. vol. i. p. 323.

Asterophyllites longifolia.
Brongniart, Prodrome, p. 159.
? Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 311, 1862.
Feistmantel (*in part*), Vers. d. Böhm. Kohlenabl. p. 123 (? excl. figs.)
Geinitz, Jahrb. d. k. k. Geol. Reichsanst. p. 350, 1857.
„ Vers. d. Steinkf. in Sachsen, p. 9, pl. xviii. figs. 2, 3.
„ Gaea v. Sachsen, p. 70.
Giebel, Deutschl. Petrefacten, p. 28.
Heer, Foss. Flora Helv. lief. i. p. 50, pl. xix. fig. 3.
Lesquerex, Coal Flora in Pennsyl. p. 36.
Lindley & Hutton, Foss. Flora, vol. i. pl. xviii.

Roehl, Foss. Flora d. Steink. Form. Westph. p. 25 (? pl. iv. fig. 16, pl. xii. fig. 1*c*).
Römer, Palaeontographica, vol. ix. p. 20, 1862.
Sandberger, Flora d. Ober. Steink. im Bädischen Schwarzk. pp. 3 & 5.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141 & 142.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 65.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 85.
„ Steinkohlen-Calamarien, p. 53, pl. x. figs. 2, 3.

Bruckmannia longifolia.
Sternberg, Vers. i. fasc. 4, p. xxix. pl. lviii. fig. 1.

Asterophyllites tenuifolia.
Brongniart, Prodrome, p. 159.
Bronn, Index Palæont. p. 122.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 71.
Giebel, Deutschl. Petrefacten, p. 28.
Renault, Cours. d. Botan. Foss. p. 113, 1882.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 25.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 65.

Bruckmannia tenuifolia.
Sternberg, Vers. i. fasc. 4, p. xxix. pl. xix. fig. 2.

Schlotheimia tenuifolia.
Sternberg, Vers. i. fasc. 2, p. 32, pl. xix fig. 2.

Calamites tenuifolius.
Ettingshausen, Steinkf. v. Stradonitz, pl. vi. fig. 5.
„ (*in part*), Steinkf. v. Radnitz, pl. ii. fig. 1.
„ „ Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 76.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 142.

Asterophyllites jubata.
Bronn, Index Palæont. p. 122.
Lindley & Hutton, Foss. Flora, vol. ii. pl. cxxxiii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 65.

Calamites jubatus.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 77.

Asterophyllites comosa.
Bronn, Index Palæont. p. 122.
Lindley & Hutton. Foss. Flora, vol. ii. pl. cviii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 65.

Remarks.—The *Calamites Volkmanni*, Ettingshausen (Steinkf. v. Stradonitz) may perhaps belong to this species, but the foliage is not very clearly shown. The fruit of *Calamocladus longifolius* is figured and described by Weiss (Steinkohlen-Calamarien, p. 52, pl. x. figs. 2 3.)
Horizon.—Coal Measures.
Localities.—*British.* Lanarkshire: Wishaw Stirlingshire: The Cleuch, Falkirk.
Foreign. Germany: Hesse.

ANNULARIA, Sternberg, 1820.

Versuch einer Geognost. Botanisch. Darstellung der Flora der Vorwelt i. fasc. 2, p. 32.

Annularia radiata, Brongniart, sp.

Annularia radiata.
Brongniart, Prodrome, p. 156.
Bronn, Index Palæont. p. 77.
Boulay, Terr. Houil. du Nord de la France, p. 23.
Feistmantel, Zeitsch. d. Deuts. Geol. Gesell. vol. xxv. p. 597.
„ Vers. d. Böhm. Kohlenabl. p. 130.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 298, 300, & 303.
Fontaine & White, Perm. or Up. Carb. Flora, p. 39.
Giebel, Deutschl. Petrefacten, p. 29.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 43.
Lesquereux, Coal Flora in Pennsyl. p. 50.
Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 9, 1876.
Renault, Cours d. Botan. Foss. p. 133, pl. xx. fig. 4, 1882.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 28, pl. iv. figs. 3, 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 349.
Sternberg, Vers. i. fasc. 4, p. xxxi.
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 68.
Weiss, Verhandl. d. Natur. Vereins. d. Preuss. Rheinl. u. Westph. 1868, p. 85.
Zeiller, Végét. Foss. du Terr. Houil. p. 24, pl. clx. fig. 1.

Asterophyllites radiatus.
Brongniart, Class. Végét. Foss. p. 35, pl. ii. fig. 7.

Asterophyllites foliosa.
Bronn, Index Palæont. p. 122.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86.; vol. iii. p. 433.
Dawson, Acadian Geol. 2nd edit. p. 479, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 152.
„ Canadian Nat. vol. viii. p. 440.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 121, pl. xiv. figs. 2, 3, 4.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
„ Der Hangendflötzzug, p. 67.
Fontaine & White, Perm. or Up. Carb. Flora, p. 17.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 10, pl. xvi. figs. 1, 2, 3 (? fig. 4), (excl. pl. xv.)
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 424.
„ Geol. of Pennsyl. vol. ii. p. 850.
„ (*in part*), Coal Flora in Pennsyl. p. 38.
Lindley & Hutton, Foss. Flora, vol. i. pl. xxv. fig. 1.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Renault, Cours d. Botan. Foss. p. 113, 1882.
Unger, Synop. Plant. Foss. p. 32.
„ Genera et Species, p. 65.

Calamocladus foliosus.
Schimper (*in part*), Traité d. Paléont. Végét. vol. i. p. 326.

Annularia minuta.
Brongniart, Prodrome, p. 155.
Bronn, Index Palæont. p. 77.
Ettingshausen, Steinkohlf. v. Radnitz, p. 29.
„ Haidinger's Naturwiss. Abhandl. vol. iv. abth. . p 83, pl. x. figs. 1, 2.

Fontaine & White, Perm. or Up. Carb. Flora, p. 39.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 42.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 142.
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 67.

Bechera dubia.
Sternberg, Vers. i. fasc. 4, p. xxx. pl. li. fig. 3.

? Asterophyllites radiiformis.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 129, pl. xii. fig. 3.

Annularia longifolia.
Lesquereux (*in part*), Coal Flora in Pennsyl. pl. ii. fig. 1.

? Asterophyllites galioides.
Bronn, Index Palæont. p. 122.
Lindley & Hutton, Foss. Flora, pl. xxv. fig. 2.
Unger, Synop. Plant. Foss. p. 33.
„ Genera et Species, p. 66.

Remarks.—The type of *Asterophyllites foliosa*, L. and H., is preserved in the Hutton Collection, Newcastle-on-Tyne. I have examined this specimen, and cannot discover any character by which it can be distinguished from *Annularia radiata*, Brongt. sp. It is a plant of frequent occurrence in the Scotch Coal Fields, so I have had many opportunities of examining specimens of this species.

Asterophyllites galioides, L. and H., is probably only a small branchlet of their *A. foliosa*.

Notwithstanding the slight differences pointed out by Weiss between his *Asterophyllites radiiformis* and *Annularia* (*Asterophyllites*) *radiata*, Brongt. sp., I am inclined to regard his plant as referable to Brongniart's species.

Annularia longifolia, Lesqx. (*in part*), (Coal Flora in Pennsyl. pl. 2, fig. 1), is also, I think, referable to *Annularia radiata*.

Schimper unites here *Hydatica prostrata*, Artis, and *Hydatica columnaris*, Artis. These are the *Pinnularia capillacea*, L. and H., and well-known to be roots; similar fossils have been found attached to Calamite stems as their rootlets; but it is more than probable that the so-called *Pinnularia* are the rootlets of several plants, hence we are scarcely warranted in uniting them with *Annularia radiata*, though in all likelihood this plant had rootlets similar in character to *Pinnularia*.

Horizon.—Coal Measures.

Localities.—*British.* Devonshire (North): Bideford. Gloucestershire: Forest of Dean. Lanarkshire: Airdrie; Carluke. Stirlingshire: The Cleuch, Falkirk. Worcestershire: near Dudley. Wales (South): Rhymney.
Foreign. Bohemia: Stradonitz. Russia: near Kosloo, Black Sea (Presented by Capt. Spratt, R.N.).

Annularia sphenophylloides, Zenker sp.

Annularia sphenophylloides.
Andrae, Neues Jahrbuch, 1864, p. 165.
Boulay, Terr. Houil. du Nord de la France, p. 23.
Bronn, Index Palæont. p. 77.
Dawson, Acadian Geol. 2nd edit. p. 479, 1868.
„ Geol. Survey Canada Reports, 1874-5, p. 191.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants of Lower Carb. Canada, p. 38.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 129, pl. xvii. figs. 5 6.
„ Der Hangendflötzzug, p. 68.
Fontaine & White, Perm. or Up. Carb. Flora, pp. 17, 20, & 39.
Geinitz (*in part*), Gaea v. Sachsen, p. 71.

Geinitz, Jahrb. d. k. k. Geol. Reichsanst. 1857, p. 350.
„ Vers. d. Steink. in Sachsen, p. 11, pl. xviii. fig. 10.
Giebel, Deutschl. Petrefacten, p. 29.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 43.
Lesquereux, Coal Flora in Pennsyl. p. 48, pl. ii. figs. 8, 9; *var minor*, pl. iii. fig. 13.
„ Report Geol. Survey of Illinois, vol. ii. p. 444.
„ Geol. of Pennsyl. part ii. p. 852, pl. i. fig. 5, 1858.
Newberry, Expl. Exped. from Santa Fé, &c. p. 18.
Renault, Cours d. Botan. Foss. p. 133, pl. xx. fig. 3.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 29, pl. iv. fig. 5.
Römer, Palaeontographica, vol. ix. p. 21, 1862.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarzk. pp. 2 & 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 347, pl. xvii. figs. 12, 13.
Sterzel, Zeitsch. d. Deut. Geol. Gesell. vol. xxxiv. p. 685, pl. xxviii.
Stur, Verh. d. k. k. Geol. Reichsanst. 1884, pp. 138, 268.
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 68.
„ Anthracit-Ablager in Kärnthen, p. 783, pl. i. fig. 8.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 131.
„ Verhandl. Natur. Vereines Preuss. Rheinl. Westph. 1868, p. 85.
Zeiller, Végét. Foss. du Terr. Houil. p. 25, pl. clx. fig. 4.
„ Flore Houil. des Asturies, p. 4.

Galium sphenophylloides.
Zenker, Neues Jahrb. 1833, p. 398, pl. v. fig. 6.

Annularia brevifolia.
Brongniart, Prodrome, p. 156.
Bronn, Index Palæont. p. 76.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 85.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Gomes, Flora Foss. do. Terr. Carbon. do Porto Serra do Bussaco, p. 6.
Heer, Urwelt d. Schweiz, p. 9, fig. 10.
„ Flora Foss. Helv. lief. i. p. 51, pl. xix. figs. 6–9 (fig. 10 ?).
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 69.

Annularia microphylla.
Römer, Palaeontographica, vol. ix. p. 21, pl. v. fig. 1.

Rubeola mineralis.
Luid, Lith. Brit. Ichnographia, p. 12, pl. v. fig. 202, 1760.

Stachannularia calathifera.
Weiss, Steinkohlen-Calamarien, p. 27, pl. iii. fig. 11.

Remarks.—The cones described by Weiss as *Stachannularia calathifera*, have been found attached to *Annularia sphenophylloides*, and figured by Sterzel (Zeitsch. d. Deut. Geol. Gesell. vol. xxxiv.).

Localities.—British. Somersetshire: Camerton. Worcestershire: Forest of Wyre.
Foreign. Saxony: Zwickau. Switzerland: Col d'Anterne, Chamounix (Presented by Alfred Wills, Esq.). United States: Grundy Co., Illinois.

Annularia stellata, Schlotheim sp.

Annularia stellata.
Zeiller, Végét. Foss. du Terr. Houil. p. 26, pl. clx. figs. 2, 3.
„ Flore Houil. des Asturies, p. 4.

Casuarinites stellatus.
Schlotheim, Flora u. Vorwelt, p. 32, pl. i. fig. 4.
„ Petrefactenkunde, p. 397.

Bornia stellata.
Sternberg, Vers. i. fasc. 4, p. xxviii.

Annularia longifolia.
Andrae, Neues Jahrbuch, 1864, p. 165.
„ Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 121.
Brongniart, Prodrome, p. 156.
Bronn, Index Palæont. p. 76.
Dawson, Geol. Survey Canada Reports, 1874–5, pp. 192 & 196.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants of Lower Carb., Canada, p. 38.
Ettingshausen, Steinkf. v. Stradonitz,* p. 8, pl. 1. fig. 4.
„ Steinkf. v. Radnitz, p. 30.
„ Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 84.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 127, pl. xv. figs. 3, 4, pl. xvi. fig. 1.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Steinkf. v. Kralup. in Böhmen, pp. 10 & 19.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 294, 298, & 303.
„ Steinkohl. u. Perm-Ablager. p. 71.
„ Der Hangendflötzzug, p. 68.
Fontaine & White, Perm. or Up. Carb. Flora, pp. 17, 20, & 39.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 10 (? pl. xviii. figs. 8, 9), & pl. xix.
„ Neues Jahrbuch, 1867, p. 275.
Germar, Vers. v. Wett. u. Löbejun, p. 25, pl. ix.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 6.
Giebel, Deutschl. Petrefacten, p. 29.
Göppert, Foss. Flora d. Perm. Form. p. 38.
Heer, Urwelt d. Schweiz, p. 9, fig. 7.
„ Flora Foss. Helv. lief. i. p. 51, pl. xix. figs. 4, 5.
Lesquereux, Coal Flora in Pennsyl. p. 45, pl. ii. fig. 2 (excl. fig. 1) (? pl. iii. figs. 10, 12).
„ Report Geol. Survey of Illinois, vol. ii. p. 444, vol. iv. p. 422, pl. xxi. figs. 1, 2 ?
Newberry, Ann. & Mag. Nat. Hist. vol. xii., 1883, p. 173.
Renault, Cours d. Botan. Foss. p. 126, pl. xx. fig. 1, 1882.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 28, pl. iv. fig. 6 (15 ?)
Sandberger, Flora d. Steinkf. im Bädischen Schwarzk. pp. 3, 5.
Schimper, Traité d. Paléont. Végét. vol. i. p. 348, pl. xxii. figs. 5, 6, & 10.
Unger, Anthracit. Ablager. in Kärnthen, p. 783, pl. i. fig. 9.
„ Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 68.
Weiss, Verhandl. Natur. Vereines Preuss. Rheinl. Westph. 1868, p. 85.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 130.
White, State of Indiana 2nd ann. Report, Dept. of Statistics and Geol. 1880, p. 521, pl. xi. figs. 1, 2.

Annularia spinulosa.
Bronn, Index Palæont. p. 77.
Giebel, Deutschl. Petrefacten, p. 29.
Sternberg, Vers. i. fasc. 4, p. xxxi. pl. xix. fig. 4.
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 68.

Annularia floribunda.
Brongniart, Prodrome, p. 156.

* Abhandl. k. k. Geol. Reich. Wien, Bd. I. abth. 3, No. 4.

Bronn, Index Palæont. p. 76.
Sternberg, Vers. i. fasc. 4, p. xxxi.
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 68.

Annularia fertilis.
Brongniart, Prodrome, p. 156.
Bronn, Index Palæont. p. 76.
„ Lethæa Geog. vol. i. pt. ii. p. 105, pl. viii. fig. 8.
Eichwald, Lethæa Rossica, vol. i. p. 187, pl. xiv. fig. 9.
Ettingshausen, Steinkf. v. Radnitz, p. 29.
„ Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 83.
Giebel, Deutschl. Petrefacten, p. 29.
Sternberg, Vers. i. fasc. 4, p. xxxi. pl. li. fig. 2.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 34.
„ Genera et Species, p. 67.
„ Neues Jahrbuch, 1842, p. 608.

Annularia carinata.
Bronn, Index Palæont. p. 76.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. I. p. 84.
Fontaine & White, Perm. or Up. Carb. Flora, p. 38.
Geinitz, Dyas, p. 137.
„ Gaea v. Sachsen, p. 71.
Giebel, Deutschl. Petrefacten, p. 29.
Göppert, Foss. Flora d. Perm. Form. p. 38.
Gümbel, Denk. d. k. Baier. Bot. Gesell. vol. iv. p. 100.
Gutbier, Isis, 1837, p. 436.
„ Die Vers. d. Rothl. in Sachsen, p. 9, pl. ii. figs. 4–8.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 459.
Unger, Genera et Species, p. 69.

Asterophyllites equisetiformis.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 433, 1847.
Dawson, Acadian Geol. 2nd ed. p. 480, 1868.
„ Canadian Nat. vol. viii. p. 440.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 152.
„ Foss. Plants of Low. Carb., Canada, p. 38.
Lindley & Hutton, Foss. Flora, vol. ii. pl. cxxiv.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.

Aparinæ densius foliatæ.
Luid, Lith. Brit. Ichnographia, p. 12, pl. v. fig. 201, 1760.
Scheuchzer, Herb. diluv. pl. iii. fig. 3, 1723.

Remarks.—Gutbier's *Annularia carinata* does not appear to differ in any essential manner from this species. The little irregularly placed pits on the stem, which form one of its chief characters, have evidently been caused by *Spirorbis*, which are commonly found on fossil plants that have been immersed in water for any length of time before mineralization.*

Many authors unite here, as the fruit of *Annularia stellata*, *Stachannularia* (*Bruckmannia*) *tuberculata*, Sternberg, but I am not aware that this cone has ever been found attached to stems of *Annularia stellata*, and though they often occur together, till they are found in organic union it cannot positively be affirmed that *Stachannularia tuberculata* is the fruit of this species. It must, however, be admitted that indirect evidence points strongly in favour of the view of the union of these two fossils.†

Horizon.—Coal Measures.

* Etheridge, Geol. Mag. 1880, p. 216.
† See Weiss, Steinkohlen-Calamarien, p. 18.

Localities.—British. Gloucestershire: Forest of Dean (Presented by the late Sir P. G. Egerton, Bart., Trustee Brit. Mus.). Northumberland: Newcastle-on-Tyne. Somersetshire: Camerton; Radstock.
Foreign. Bohemia: Stradonitz. France: Sarrebourg; St. Jean, near St. Etienne. Saxony: Wettin, near Halle; Zwickau. Tuscany: East of Valterra (Presented by J. G. Pentland, Esq.). United States: Mazon Creek, Grundy Co., Illinois.

Annularia spicata, Gutbier sp.

Annularia spicata.
Renault, Cours d. Botan. Foss. p. 133, pl. xx. fig. 5, 1882.
Schimper, Traité d. Paléont. Végét. vol. i. p. 350, vol. iii. p. 459.

Asterophyllites spicatus.
Geinitz, Dyas, p. 136, pl. xxv. figs. 5, 6.
Göppert, Foss. Flora d. Perm. Form. p. 37.
Gutbier, Vers. d. Rothl. in Sachsen, p. 9, pl. ii. figs. 1, 3.
Weiss, Verhandl. Natur. Vereines Preuss. Rheinl. Westph. 1868, p. 85.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 128, pl. xviii. fig. 32 (34, 35 ?).

Annularia minuta.
Wood, Trans. Amer. Phil. Soc. vol. xiii. p. 347, pl. viii. fig. 2.

Asterophyllites delicatula.
Geinitz, Gaea v. Sachsen, p. 70.

Horizon.—Coal Measures.
Locality.—Foreign. Russia: near Kosloo, Black Sea (Presented by Captain Spratt, R.N.).

(?) RHIZOCARPEÆ.

SPHENOPHYLLUM, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 34.

Sphenophyllum cuneifolium, Sternberg, sp.

Sphenophyllum cuneifolium.
Renault, Cours d. Botan. Foss. p. 87, pl. xiii. fig. 10, 1882.
Zeiller, Végét. Foss. du. Terr. Houil. p. 30, pl. clxi. figs. 1–2.
„ Flore Houil. des Asturies, p. 4.

Rotularia cuneifolia.
Sternberg, Vers. i. p. 33, pl. xxvi. fig. 4 *a.* and *b.*

Sphenophyllum erosum.
Boulay, Terr. Houil. du Nord de la France, p. 23.
Bronn, Index Palæont. p. 1166.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 430, pl. xxiii. fig. 3, 1847.
Coemans and Kickx, Bull. l'Acad. Roy. Belgique, 2e sér. vol. xviii. p. 149, pl. i. fig. 5.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 152.
„ Canadian Natur. vol. viii. p. 441.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Heer, Flora Foss. Helv. 1 lief. p. 53, pl. xix. figs. 11–14.
Kidston in Cadell, Trans. Edinb. Geol. Soc. vol. iv. p. 334.
Lindley and Hutton, Foss. Flora, vol. i. pl. xiii.

Ludwig, Bull. Soc. Imp. Nat. Moscou, 1876, p. 10.
Portlock, Geol. Report of Londonderry, p. 603.
Renault, Ann. d. Scienc. Nat. 6e, sér. Bot. vol. iv. p. 282.
Roehl, Foss. Flora d. Steink.-Form. Westphalens, p. 30, pl. iv. fig. 19.
Schimper, Traité d. Paléont. Végét. vol. i. p. 341, pl. xxv. figs. 10–14.
Unger, Synop. Plant. Foss. p. 114.
„ Genera et Species, p. 70.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 135.

Sphenophyllum Schlotheimii, var *erosum*.
Ettingshausen, Steinkohlf. v. Radnitz, p. 31, pl. xi. fig. 2.
„ Steinkohlf. v. Stradonitz, p. 8, pl. vi. fig. 6.
„ Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 86, 1851.

Sphenophyllum dentatum.
Brongniart, Prodrome, pp. 68 and 172.
Bronn, Index Palæont. p. 1166.
Giebel, Deutschl. Petrefacten, p. 30.
Newberry, Explor. Exped. from Santa Fé, &c., p. 18.
Unger, Synop. Plant. Foss. p. 113.
„ Genera et Species, p. 70.

Sphenophyllum Schlotheimii, var. *dentatum*.
Ettingshausen, Steinkohlf. v. Radnitz, p. 30
„ Steinkohlf. v. Stradonitz, p. 8.
„ Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 85, 1851.

Rotularia pusilla.
Bischoff, Die Kryptogam. Gewächse, p. 90, pl. xiii. fig. 3.
Sternberg, Vers. i. fasc. iv. p. xxxii.

Rotularia asplenioides.
Sternberg, Vers. i. fasc. ii. p. 30.

Sphenopteris (*? Sphenophyllum*) *erosum*.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 13.

Horizon.—Coal Measures.
Localities.—*British*. Lanarkshire: Carluke. Worcestershire: Forest of Wyre.
Foreign. Russia: near Kosloo, Black Sea. (Presented by Captain Spratt, R.N.)

S. cuneifolium, var. **saxifragæfolium**, Brongniart.

Sphenophyllum erosum, var. *saxifragæfolium*.
Coemans and Kickx, Bull. l'Acad. Roy. Belgique, vol. xviii. p. 151, pl. i. fig. 6.
Renault, Ann. d. Scienc. Nat. 6e sér. Bot. vol. iv. p. 282.

Sphenophyllum saxifragæfolium.
Andræ, Jahrb. d. Naturwiss. Vereines, Halle, p. 121, 1850.
Bronn, Index Palæont. p. 1166.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 152.
„ Canadian Nat. vol. viii. p. 441.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Giebel, Deutschl. Petrefacten, p. 30.
Geinitz, Flora d. Hainichen-Ebersdorfer, p. 37, pl. xiv. figs. 7–10.
„ Vers. d. Steinkf. in Sachsen, p. 13, pl. xx. figs. 8–10
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 52.

Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 10, 1876.
Renault, Cours d. Botan. Foss. p. 87, pl. xiii. figs. 11–14, 1882
Roehl, Foss. Flora d. Steink.-Form. Westphalens,* p. 31.
Römer, Beitr. Kenntniss d. Nordw. Harzgeb. † p. 22.
Zeiller, Végét. Foss. du Terr. Houil. p. 31, pl. clxi. figs. 3-6.
„ Flore Houil. des Asturies, p. 4.
Weiss, Verhand. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 86.

Sphenophyllites saxifragæfolius.
Germar, Vers. v. Wettin u. Löbejun, p. 17, pl. vii. fig. 1.

Rotularia saxifragæfolia.
Sternberg, Vers. i. fasc. 4, p. xxxii., pl. lv. fig. 4.

Sphenophyllum Schlotheimii, var. *saxifragæfolium.*
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 85, 1851.
„ Steinkohlf. v. Radnitz, p. 31.
„ Steinkohlf. v. Stradonitz, p. 7.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.

Sphenophyllum fimbriatum.
Brongniart, Prodrome, p. 68.
Bronn, Index Palæont. p. 1166.
Giebel, Deutschl. Petrefacten, p. 30.
Unger, Synop. Plant. Foss. p. 113.
„ Genera et Species, p. 70.
„ Neues Jahrbuch, 1842, p. 608.

Sphenophyllum Schlotheimii, var. *fimbriatum.*
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 85, 1851.
„ Steinkohlf. v. Radnitz, p. 31, pl. xi. figs. 1 and 3; pl. xii. figs. 1, 2, 3.
„ Steinkohlf. v. Stradonitz, p. 7.

Sphenophyllum quadrifidum.
Brongniart, Prodrome, p. 68.
Bronn, Index Palæont. p. 1166.
Unger, Synop. Plant. Foss. p. 113
„ Genera et Species, p. 70

Sphenophyllum dichotomum.
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 86, 1851.
Giebel, Deutschl. Petrefacten, p. 30.
Stur, Culm Flora, heft ii. p. 225.
Unger, Genera et Species, p. 71.

Rotularia dichotoma.
Germar and Kaulfuss, Act. Acad. Nat. Curios. vol. xv. p. 226, pl. lxvi. fig. 4.

Sphenophyllum emarginatum.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, p. 12, pl. xx. figs. 5 and 6.

Rotularia polyphylla.
Sternberg, Vers. i. fasc. iv. p. xxxii. pl. l. fig. 4.

Remarks.—Many authors separate *S. saxifragæfolium* from *S. cuneifolium*

* Palæontographica, 1868, xviii. Bd. 1 lief.
† Palæontographica, 1862, ix. Bd. 1 lief.

(*S. erosum* L. and H.), and treat it as a distinct species. I have, however, followed Coemans and Kickx, who regard it as a variety of *S. cuneifolium*.

Horizon.—Coal Measures.

Localities.—*Foreign.* Bohemia. Saxony: Zwickau.

Sphenophyllum Schlotheimii, Brongniart.

Sphenophyllum Schlotheimii.

Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 121.
Boulay, Terr. Houil. du Nord. de la France, p. 23.
Brongniart, Prodrome, p. 68.
Bronn, Index Palæont. p. 1166.
Coemans and Kickx, Bull. l'Acad. Roy. Belgique, 2e Sér. vol. xviii. p. 140, pl. i. fig. 1, 1864.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 36.
„ Canadian Nat. vol. viii. p. 441.
„ Geol. Survey of Canada, Reports, 1874–5, p. 192.
Eichwald, Lethæa Rossica. vol. i. p. 192, pl. xiv. figs. 10–11.
Feistmantel, Karl, Der Hangendflötzzug, p. 69.
„ O. Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, 298, 300, 303.
„ Zeitsch. d. Deuts. Geol. Gesell. vol. xxv. pp. 594 and 597.
„ Steinkohlf. v. Kralup. in Böhmen. pp. 10, 20.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Giebel, Deutschl. Petrefacten, p. 30.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 7.
Göppert, Nova Acta Acad. Leop. Car. vol. xxxii. pl. ii. fig. 3, 1865.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 51.
Heer, Flora Foss. Helv. lief. i. p. 52, pl. xix. fig. 16.
Lesquereux, Bull. Mus. Comp. Zoology, Harvard Col. vol. vii. p. 244, 1882.
„ Coal Flora in Pennsyl. p. 52, pl. ii. figs. 6, 7.
„ Geol. of Pennsyl. vol. ii. p. 852, 1858.
„ Report, Geol. Survey of Illinois, vol. ii. p. 444.
Renault, Ann. d. Scienc. Nat. 6e sér. Bot. vol. iv. p. 281.
„ Cours d. Botan. Foss. p. 86, pl. xiii. figs. 6 and 7, 1882.
Schimper, Traité d. Paléont. Végét. vol. i. p. 339, pl. xxv. figs. 19–21.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 140, 142, 143.
Unger, Synop. Plant. Foss. p. 113.
„ Genera et Species, p. 69.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 85.

Sphenophyllum Schlotheimii, var. *genuinum.*

Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 85, 1851.
„ Steinkohlf. v. Radnitz, p. 30.
„ Steinkohlf. v. Stradonitz, p. 7.

Sphenophyllites Schlotheimii.

Germar, Isis, 1837, p. 425, pl. ii. fig. 1.
„ Vers. v. Wettin u. Löbejun, p. 13, pl. vi. figs. 1–4.

? Sphenophyllum Schlotheimii, var. *brevifolium.*

Schmalhausen, Mém. l'Acad. Impér. Sc. St. Pétersbourg, 7e sér. vol. xxxi. p. 10, pl. ii. figs. 3, 4.

Sphenophyllum emarginatum.

Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, p. 12, pl. xx. figs. 2 and 7.

Rotularia marsileæfolia.
Sternberg (*in part*), Vers. i. fasc. ii. p. 30, fasc. iv. p. xxxii. (excl. syn. Brongt.).

Palmacites verticillatus.
Schlotheim, Flora d. Vorwelt, p. 57, pl. ii. fig. 24.
„ Petrefactenkunde, p. 396.

Remarks.—From the small number of the veins, *S. Schlotheimii*, var. *brevifolium*, Schmalh., appears to approach more closely to *S. emarginatum*, Brongt., than to *S. Schlotheimii*, Brongt.
Horizon.—Coal measures.
Localities.—Foreign. Russia : Donetz. Saxony : Wettin, near Halle.

Sphenophyllum emarginatum, Brongniart.

Sphenopyhllum emarginatum.
Andrae, Neues Jahrbuch, 1864, p. 165.
Coemans and Kickx, Bull. l'Acad. Roy. Belgique, 2e sér. vol. xviii. p. 144, pl. i. fig. 2, pl. ii. figs. 1–3.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 152.
„ Canadian Nat. vol. viii. p. 441.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Feistmantel, Karl, Der Hangendflötzzug, p. 69.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, pl. xx. figs. 1, 3, 4.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 52.
König, Icones Fossilium Sectiles, pl. xii. fig. 149.
Lesquereux, Bull. Mus. Comp. Zoology, Harvard Coll. vol. vii. p. 244, 1882.
„ Coal Flora in Pennsyl. p. 53.
„ Geol. of Pennsyl. vol. ii. p. 853, 1858.
„ Report Geol. Survey of Illinois, vol. ii. p. 444.
Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 10, 1876.
Renault, Cours d. Botan. Foss. p. 86, 1882.
„ Ann. d. Scienc. Nat. 6e sér. Bot. vol. iv. p. 282.
Roehl, Foss. Flora d. Steink.-Form. Wesphalens,* p. 30, pl. iv. fig. 12 (13?)
Römer, Beitz. z. Geol. Kenntniss d. Nordw. Harzgeb.† p. 21.
Schimper, Traité d. Paléont. Végét. vol. i. p. 339, pl. xxv. figs. 15–17.
Stur, Verh. d. k. k. Geol. Reichsanst. 1884, p. 141.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.
Unger, Synop. Plant. Foss. p. 113.
„ Genera et Species, p. 69.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 86.
„ Foss Flora d. jung. Steink. u. d. Rothl. p. 134.
Zeiller, Flora Houil. des Asturies, p. 4.

Sphenophyllum Schlotheimii.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 430, 1847.
Lindley and Hutton, Foss. Flora, vol. i. pl. xxvii.

Sphenophyllum truncatum.
Brongniart, Prodrome, p. 68.
Renault, Cours de Botan. Foss. p. 87, pl. xiii. figs. 8, 9, 1882.
Unger, Synop. Plant. Foss. p. 113.
„ Genera et Species, p. 72.

* Palæontographica, 1868, xviii. Bd., 1 lief.
† Palæontographica, 1862, ix. Bd., 1 lief.

S. emarginatum, var. Brongniartianum, Coemans and Kickx.

Sphenophyllum emarginatum, var. *Brongniartianum.*
Coemans and Kickx, Bull. l'Acad. Roy. Belgique, 2e sér. vol. xviii. p. 145, pl. i. fig. 3, 1864.
Roehl, Foss. Flora d. Steink.-Form. Westphalens,* p. 31, pl. xxvi. fig. 2, pl. xxxii. fig. 6a.
Schimper, Traité d. Paléont. Végét. vol. i. p. 340, pl. xxv. figs. 15–17.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 86.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 134.

Sphenophyllum emarginatum.
Brongniart, Prodrome, p. 68.
Bronn, Lethæa Geog. vol. i. p. 106, pl. viii. fig. 10.
Ettingshausen, Steinkf. v. Radnitz, p. 31.
Giebel, Deutschl. Petrefacten, p. 30.

Sphenophyllites emarginatus.
Brongniart, Classif. d. Végét. Foss. p. 34, pl. ii. fig. 8, 1822.

Sphenophyllum Osnabrugense.
Römer, Beitz. z. Kennt. d. Nordw. Harzgeb.† p. 21, pl. v. fig. 2, 1860.

Rotularia marsileæfolia.
Bischoff, Die Kryptogam. Gewächse. p. 89, pl. xiii. fig. 1.
Sternberg (*in part*), Vers. i. fasc. 4, p. xxxii. (excl. syn. Schloth.).

Horizon.—Coal Measures.
Localities :—*Foreign.*

Sphenophyllum emarginatum.
Saxony : Zwickau.

var. *Brongniartianum.*
Bohemia.
Switzerland : (?) Col. d'Anterne, Chamounix. (Presented by Lady Murchison.)

Sphenophyllum angustifolium, Germar.

Sphenophyllum angustifolium.
Andrae, Jahrb. d. Natur. Vereines, Halle, p. 121, 1850.
Bronn, Index Palæont. p. 1166.
„ Lethæa Geog. vol. i. pt. ii. p. 106, pl. vi. *bis*, fig. 17.
Coemans and Kickx, Bull. l'Acad. Roy. Belgique, vol. xviii. p. 154, pl. i. fig. 1, 1864.
Giebel, Deutschl. Petrefacten, p. 30.
Grand'Eury, Flore Carbon. du Dép. de la Loire, p. 52 (? pl. vi. figs. 7–10).
Renault, Cours d. Botan. Foss. p. 88, pl. xiii. figs. 19–23, 1882.
„ Ann. d. Scienc. Nat. 6e sér. vol. iv. Bot. p. 283.
Roehl, Foss. Flora d. Steink.-Form. Westphalens,* p. 32, pl. iv. fig. 18.
Schimper, Traité d. Paléont. Végét. vol. i. p. 343, pl. xxv. fig. 14.
Unger, Genera et Species, p. 71.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 86.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 136.
Zeiller, Flore Houil. des Asturies. p. 4.

Sphenophyllites angustifolius.
Germar, Vers. v. Wettin u. Löbejun, p. 18, pl. vii. figs. 4–8.

Sphenophyllum Schlotheimii, var. *angustifolium.*
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. i. p. 85, 1851.

* See *ante.* † See *ante.*

Sphenophyllum trifoliolatum.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 853, pl. i. fig. 7, 1858.

Horizon.—Coal Measures.
Localities.—*Foreign.* Bavaria: Kammerberg. Moravia: Rossitz. Silesia: Waldenburg.

Sphenophyllum longifolium, Germar.

Sphenophyllum longifolium.
Bronn, Index Palæont. p. 1166.
Coemans and Kickx, Bull. l'Acad Roy. Belgique, 2e sér. vol. xviii. p. 147, pl. i. fig. 4.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 152, vol. xxx. p. 216.
„ Canadian Natur. vol. viii. p. 441.
„ Foss. Plants of Lower Carb. Canada, p. 38.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 17, 38.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 13, pl. xx. figs. 15–17.
Giebel, Deutschl. Petrefacten, p. 30.
Lesquereux, Coal Flora in Pennsyl. p. 53.
Renault, Ann. d. Scienc. Nat. 6e sér. Bot. vol. iv. p. 282.
„ Cours d. Botan. Foss. p. 88, pl. xiii. fig. 18, 1882.
Roehl, Foss. Flora d. Steink.-Form. Westphalens,* p. 31, pl. iv. fig. 14.
Schimper, Traité d. Paléont. Végét. vol. i. p. 340, pl. xxv. figs. 22–23.
Unger, Genera et Species, p. 70.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 86, 1868.

Sphenophyllites longifolius.
Germar, Isis, 1837, p. 426, pl. ii. figs. 2*a*, 2*b*.
„ Vers. v. Wettin u. Löbejun, p. 17, pl. vii. fig. 2.

Sphenophyllum Schlotheimii, var. *longifolium.*
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. abth. i p. 85 1851.
„ Steinkf. v. Stradonitz, p. 7.

Sphenophyllum majus.
Bronn, Index Palæont. p. 1166.
„ Lethæa Geog. vol. i. p. 106, pl. viii. fig. 9.
Römer, Beitr. z. Geol. Kennt. d. Nordw. Harzgeb.† vol ix. p. 22, 1860.

Rotularia major.
Bronn, in Bischoff, Die Kryptogam. Gewäches. p. 131, pl. xiii. fig. 2.

Horizon.—Coal Measures.
Locality.—*Foreign.* Saxony: Wettin, near Halle.

* Palæontographica, 1868, xviii. Bd. 1 lief.
† Palæontographica, 1862, ix. Bd. 1 lief.

Fructifications.

I have included here certain small cones, the plants to which they belong being still doubtful. Some of them are allied to *Calamites* (*Calamocladus* and *Annularia*), but others may belong to *Sphenophyllum*.

VOLKMANNIA, Sternberg, 1820.

Versuch einer geognostisch-botanischen Darstellungen der Flora der Vorwelt, i. fasc. iv. p. xxix.

Volkmannia Morrisii, Hooker.

Volkmannia Morrisii.

Hooker, Quart. Journ. Geol. Soc. vol. x. p. 199, pl. vii. 1854.

Remarks.—The following is extracted from Sir Joseph Hooker's description of this interesting fossil :—

"It consists of a straight, undivided, apparently nearly cylindrical stem or termination of a branch, nine inches long, gradually tapering from $\frac{1}{2}$ to $\frac{1}{3}$ of an inch in diameter (as compressed), interrupted by seventeen nodes or joints, which bear each a series of tubercles. The internodes are grooved and diminish in length upwards, the grooves alternate with the tubercles, which appear to be placed on the intervening ridges; the number of striæ and tubercles is from ten to fifteen on each surface. The lower transverse series of tubercles crosses obliquely the diameter of the stem, as though indicating a spiral arrangement; this, however, I do not doubt is the effect of unequal pressure during fossilisation, it not being apparent in the seven upper nodes, which are nearly horizontal. The upper node appears to bear a whorl of subulate suberect leaves, half an inch long, pressed against a large, terminal, erect, oblong body resembling a cone.

"This is no doubt an organ of fructification, but whether of male, female, or hermaphrodite flowers, there are no means even of assuming; it is $2\frac{1}{2}$ inches long and $1\frac{1}{8}$ inch in diameter, blunt at both ends, and appears to have been in a state of decomposition when embedded.

"There is an appearance of what is usually (but often very erroneously) termed a bark, extending along the circumference, and for some distance along the axis of the cone, all around; and this, as well as the surface from which it has been removed, presents obscure traces of hexagonal areolæ; this appearance, however, varies so much according to the light in which the fossil is held, that I cannot place much dependence upon it."

This unique cone is probably allied to *Calamites*. There is only a reproduction in the Collection, but it bears out the characters as mentioned in the original description. I am inclined to think that the cone has not suffered much from decay before mineralisation, as believed by Sir Joseph Hooker, but that it was only in an early stage of development. I cannot form even a conjecture as to what plant this fruit may have belonged.

Horizon.—Lower Carboniferous Limestone Group; Ironstone midway between the Cannel Coal and Main Limestone.

Locality.—British. Lanarkshire: Carluke.

STACHANNULARIA, Weiss, 1876.

Steinkohlen-Calamarien (Abhandl. z. Geolog. Specialkarte von Preussen u. d. Thuringischen Staaten.), p. 1.

Stachannularia tuberculata. Sternberg sp.

Stachannularia tuberculata.

Sterzel, Zeitsch. d. Deut. Geol. Gesell. vol. xxxiv. p. 685.

Weiss, Steinkohlen-Calamarien, p. 17, pl. i. figs. 2–4, pl. ii figs. 1–3, 5 left; pl. iii. figs. 3–10 and 12.

Bruckmannia tuberculata.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 128, pl. xvi. figs. 2–3, pl. xvii. fig. 1.
Renault, Cours d. Botan. Foss. p. 129, pl. xxi. figs. 1–6.
Sternberg, Vers. i. fasc. 4, p. 29, pl. xlv. fig. 2.

Asterophyllites tuberculatus.
Brongniart, Prodrome, p. 159.
Lindley and Hutton, Fossil Flora, vol. i. pl. xiv. vol. iii. pl. clxxx.

Asterophyllites foliosa.
Geinitz, Vers. d. Steink. in Sachsen, pl. xvi. fig. 4.

Annularia longifolia.
Geinitz, Vers. d. Steink. in Sachsen, pl. xviii. figs. 8, 9.
Germar, Vers. v. Wettin. u. Löbejun, pl. ix. fig. 4.
Schimper, Traité d. Paléont. Végét. pl. xxii. fig. 10.

Remarks.—I have only given a few of the more important references to this species, as its synonymy is in a very unsatisfactory condition. It is more than probable that several species have at different times been placed under *Stachannularia* (*Bruckmannia*) *tuberculata*, Sternb. sp., therefore, unless where figures have been given, a list of references would be of little practical value.

The plant figured in Lebour's Illustrations of Fossil Plants (pl. v. p. 11), does not belong to Sternberg's plant, but may perhaps be *Calamostachys paniculata*, Weiss (Steink. Calamarien, p. 59, pl. xiii. fig. 1).

The specimen from Felling Colliery, though its apex is wanting, measures 9¼ inches in length, and shows 37 whorls of bracts, which are on an average a quarter of an inch long. The bracts are not individually very distinctly shown, but there must have been about 30 in a whorl. The sporangia are completely obscured by the bracts.

Reasons are given in the remarks appended to *Annularia longifolia* why this species is separately treated.

Horizon.—Coal Measures.
Localities.—*British.* Northumberland: Felling Colliery.
Foreign. Bohemia: Radnitz.

CALAMOSTACHYS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 328.

Calamostachys Ludwigi, Carruthers, sp.

Calamostachys Ludwigi.
Weiss, Steinkohlen-Calamarien, pp. 38 and 139.

Volkmannia Ludwigi.
Carruthers, Seeman's Journ. of Bot. vol. v. p. 349, 1867.

Calamostachys typica.
Schimper, Traité de Paléont. Végét. vol. i. p. 329, pl. xxii. figs. 1, 2.

Calamites communis.
Ettingshausen, Steinkohlf. v. Radnitz, pl. viii. figs. 1 and 4.

Calamitenfrüchte.
Ludwig, Palaeontographica, vol. x. p. 11, pl. ii. 1861.

Horizon.—Coal Measures.
Locality.—*Foreign.* Saxony: Radnitz.

MACROSTACHYA, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 332.

Macrostachya infundibuliformis, Brongniart, sp.

Macrostachya infundibuliformis.

Boulay, Terr. Houil. du Nord. de la France, p. 22.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 48.
Lesquereux, Coal Flora in Pennsyl. p. 60, pl. iii. figs. 17–20 (excl. fig. 14).
Renault, Cours d. Botan. Foss. p. 122, pl. xviii. fig. 2, 1882.
Schimper, Traité d. Paléont. Végét. vol. i. p. 133, pl. xxiii. figs. 15–17, (? excl. figs. 13, 14).
Weiss, Steinkohlen-Calamarien, p. 71, pl. vi. figs. 1–4, pl. xviii. figs. 1, 3, 4.

Equisetites infundibuliformis.

Bronn, Lethæa Geog. vol. i. part ii. p. 102 (excl. fig. 16 in ref.).
Ettingshausen, Haidinger's Naturwiss. Abhandl. vol. iv. 1 Abth. p. 92
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Vers. d. Böhm. Kohlenab. p. 92 (pl. i. figs. 2, 3, 5 ?).
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 294 and 298.
„ Frücht. Foss. Pflanzen. Böhm. Steink. p. 4.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, p. 3 (excl. figs.).
Giebel, Deutschl. Petrefacten, p. 24.
Renault, Ann. d. Scienc. Nat. 6e sér. vol. ii. p. 20, pl. i. fig. 11, pl. iii. figs. 19–23.
Roehl, Foss. Flora d. Steink.-Form. Westphalens, p. 17, pl. iv. fig. 9.
Sternberg, Vers. ii. p. 44.
Weiss, Verhand. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 83, 1868.
Unger, Synop. Plant. Foss. p. 28 (excl. ref. in Bischof).
„ Genera et Species, p. 59 (excl. ref. in Bischof).

Equisetum infundibuliforme.

Brongniart (*in part*), Hist. d. Végét. Foss. p. 119, pl. xii. figs. 14, 15 (excl. syn. and fig. 16).
Germar, Vers. v. Wettin u. Löbejun, p. 91, pl. xxxii. fig. 3.
Gutbier (var. β), Vers. d. Zwick. Schwarzk. p. 30, pl. iii*b*. figs. 5, 6.

Huttonia carinata.

Andrae, Jahrb. d. Naturwiss. Vereines, Halle, p. 122, 1850.
Friestmantel, O., Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 594.
„ Vers. d. Böhm. Kohlenab. p. 103, pl. iii. fig. 3, pl. ix.
„ Abhandl. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
„ K., Der Hangendflötzzug, p. 70.
Fiedler, Die Foss. Früchte, p. 269.
Germar, Vers. v. Wettin u. Löbejun, p. 90, pl. xxxii. figs. 1, 2.
Giebel, Deutschl. Petrefacten, p. 27.
Roehl, Foss. Flora d. Steink.-Form. Westphalens, p. 21 (? pl. x. fig. i. pl. xxiv. fig. 2).
Römer, Palaeontographica, vol. ix. p. 20, 1862.

Macrostachya carinata.

Zeiller, Végét. Foss. du Terr. Houil. p. 23, pl. clix. fig. 4.

Equisetum.

Brongniart, Classif. d. Végét. Foss. p. 90, pl. iv. fig. 4.

Horizon.—Coal Measures.
Locality.—Moravia: Rossitz.

Note.—There is no more interesting class of fossil plants than the little cones found associated with *Calamites*, *Annularia*, and *Sphenophyllum*. As most of the information regarding their inner structure has been derived

from fragmentary specimens in which the bracts had been removed, causing the sporangia to be exposed, it is of the greatest importance that specimens in this condition should be secured. Often their beauty is not such as to attract the attention of the general collector; but as these specimens are of the greatest value to those working out the minute structure of fossil fruits, it is to be hoped that all who have the opportunity will carefully collect them.

Those interested in this group of fossils would do well to consult the "Steinkohlen-Calamarien" by Weiss.

Rootlets.

PINNULARIA, Lindley and Hutton, 1834.

Fossil Flora of Great Britain, vol. ii. p. 81.

Pinnularia capillacea, Lindley and Hutton.

Pinnularia capillacea.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 130.
Bronn, Index Palæont. p. 981.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 434, 1847.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 153.
„ Canadian Nat. vol. viii. p. 441.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Feistmantel, O., Steink. v. Kralup in Böhmen, p. 11.
„ Steink. u. Perm-Ablager. p. 72.
„ K., Der Hangendflötzzug, p. 96.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 46, pl. vi. fig. 6.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 878, pl. xvii. fig. 22.
„ Report Geol. Survey of Illinois, vol. ii. p. 462.
„ Coal Flora of Pennsyl. p. 518.
Lindley and Hutton, Fossil Flora, vol. ii. pl. cxi.
Portlock, Geol. Report of Londonderry, p. 603.
Roehl, Foss. Flora d. Steink.-Form. Westphalens, p. 27, pl. ii. fig. 5*a*; iv figs. 1*a* and 11.
Römer, Palaeontographica, vol. ix. p. 20, 1862.
Unger, Neues Jahrbuch, 1842, p. 608.
„ Synop. Plant. Foss. p. 259.
„ Genera et Species, p. 520.

Hydatica columnaris.
Artis, Anted. Phyt. p. 5, pl. v.
Unger, Synop. Plant. Foss. p. 259
„ Genera et Species, p. 520.

Hydatica prostrata.
Artis, Anted. Phyt. p. 1, pl. i.
Unger, Synop. Plant. Foss. p. 259.
Genera et Species, p. 520.

Myriophyllites gracilis.
Artis, Anted. Phyt. p. 12, pl. xii.
Unger, Synop. Plant. Foss. p. 243
„ Genera et Species, p. 479

Asterophyllites Artisi.
Bronn, Index Palæont. p. 122.

Asterophyllites foliosa.
Geinitz (*in part*), Vers d. Steinkf. in Sachsen, pl. xv.
Roehl (*in part*), Foss. Flora d. Steinkf.-Form. Westphalens, p. 24, pl. v. fig. 1.

Pinnularia calamitarum.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 878, pl. i. fig. 9.

Pinnularia pinnata.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 878, pl. xvii. fig. 18.

Pinnularia ficoides.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 878, pl. xvii. fig. 19.

Pinnularia horizontalis.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 878, pl. xvii. fig. 21.

Pinnularia confervoides.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 878, pl. xvii. fig. 20.

Pinnularia ramosissima.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.

Pinnularia crassa.
Dawson, Acadian Geol. 2nd Ed. p. 480, 1868.

"*A Fossil Aquatic Root.*"
Lindley and Hutton, Foss. Flora, vol. ii. pl. cx.

"*Root and Rootlets.*"
Lebour, Illustrations of Foss Plants, p. 21, pl. x.

"*Rootlets.*"
Lebour, Illustrations of Foss. Plants, p. 113, pls. lix. lx. (? lxi. and lxii.)

Remarks.—Common in all coalfields. *Pinnularia* has been found attached to *Calamites* as their rootlets, but probably the fossils usually included under *Pinnularia capillacea* may also be the rootlets of other plants. *Asterophyllites tenella*, Römer (Palaeontographica, vol. ix. p. 20, pl. v. fig. 3), is probably only one of the many forms of *Pinnularia capillacea*.

Horizon.—Coal Measures.

Localities.—British. Lanarkshire: Airdrie. Northumberland: Felling Colliery. Stirlingshire: The Cleuch, Falkirk. Worcestershire: Forest of Wyre.

Foreign. Russia: Near Kosloo, Black Sea. (Presented by Captain Spratt, R.N.)

FILICACEÆ.

SPHENOPTERIDEÆ.

EREMOPTERIS, Schimper, 1869.
Traité de Paléontologie Végétale, vol. i. p. 416.

Eremopteris artemisiæfolia, Sternberg, sp.

Eremopteris artemisiæfolia.
Boulay, Terr. Houil. du Nord de la France, p. 28, pl. i. fig. 6.
Lesquereux, Coal Flora of Pennsyl. p. 293, pl. liii. figs. 5, 6.
Schimper, Traité d. Paléont. Végét. vol. i. p. 416.

Sphenopteris artemisiæfolia.
Brongniart, Prodrome, p. 50.
„ Hist. d. Végét. Foss. p. 176, pls. xlvi. and xlvii. figs. 1, 2.
Bronn, Index Palæont. p. 1167.

? Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 429, 1847.
Dawson, Acadian Geol. 2nd Ed. p. 483, 1868.
" Quart. Journ. Geol. Soc. vol. xxii. p. 156.
" Foss. Plants of Lower Carb. Canada, p. 36.
" Canadian Nat. vol. viii. p. 445.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Göppert, Foss. Flora d. Perm. Form. p. 88.
Lebour, Illustrations of Foss. Plants, p. 67, pl. xxxiii.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 863.
Römer, Palaeontographica, vol. ix. p. 22, 1862.
Sauveur, Végét. Foss. de la Belgique, pl. xx. figs. 1-3.
Sternberg, Vers. i. fasc. iv. p. xv. pl. liv. fig. 1.

Gleichenites artemisiæfolius.
Ettingshausen, Steinkf. v. Radnitz, p. 50.
Giebel, Deutschl. Petrefacten, p. 68.
Göppert, Syst. Fil. Foss. p. 184.
Unger, Synop. Plant. Foss. p. 39.
" Genera et Species, p. 208.

Sphenopteris crithmifolia.
Bronn, Index Palæont. p. 1168.
Lindley and Hutton, Foss. Flora, vol. i. pl. xlvi.

Gleichenites crithmifolius.
Eichwald, Lethæa Rossica, vol. i. p. 90 (excl. syn. *S. affinis*).
Göppert, Syst. Fil. Foss. p. 185.
Unger, Synop. Plant. Foss. p. 40.
" Genera et Species, p. 208.

Sphenopteris stricta.
Brongniart, Prodrome, p. 50.
" Hist. d. Végét. Foss. p. 208, pl. xlviii. fig. 2.
Bronn, Index Palæont. p. 1170.
Sauveur, Végét. Foss. de la Belgique, pl. xix. fig. 1.
Schimper, Traité d. Palæont. Végét. vol. 1. p. 406.
Sternberg, Vers. i. fasc. iv. p. xv. pl. lvi. fig. 3; ii. p. 57

Sphenopteris Brongniartii.
Sternberg, Vers. ii. p. 57.

Hymenophyllites Brongniartii.
Göppert, Syst. Fil. Foss. p. 258.
Unger, Synop. Plant. Foss. p. 70.
" Genera et Species, p. 130.

Sphenopteris laxa.
Brongniart, Hist. d. Végét. Foss. p. 213.
Sternberg, Vers. i. pp. 33 and 39, fasc. 4, p. xv., fasc. 3, pl. xxxi. fig. 3; ii. p. 58.
Unger, Synop. Plant. Foss. p. 60.
" Genera et Species, p. 110.

Cheilanthites laxus.
Göppert, Syst. Fil. Foss. p. 233.

Asplenioides obtusum.
König, Icones Fossilium Sectiles, pl. xvi. fig. 199.

Sphenopteris, sp.
Lebour, Illustrations of Foss. Plants, p. 69, pls. xxxiv. xxxv. and xxxvi.

Remarks.—Specimens of *Sphenopteris crithmifolia*, which can only be regarded as a form of *Eremopteris artemisiæfolia*, in the Museum of Natural History, Newcastle-on-Tyne, show the fronds attached to a caudex. One example from Jarrow is about 7 inches long, of which the caudex occupies

4 inches. A few of the stems are attached to its summit, but very few of their pinnules are preserved. On the caudex are the scars from which the fronds have fallen. From the size of these miniature tree-fern stems, one would feel inclined to believe they had been epiphytal.

The specimen from which Brongniart's figure of *Sphenopteris stricta* was taken is preserved in the Hunterian Museum, Glasgow. The "strict" character is somewhat exaggerated in his plate, and the fern I believe to be only a varietal form of *Eremopteris artemisiæfolia*.

Horizon.—Coal Measures.

Localities.—British. Lanarkshire : Carluke. Northumberland : Newcastle-on-Tyne. Wales (South) : Beaufort.

SPHENOPTERIDIUM, Schimper, 1874.

Traité de Paléontologie Végétale, vol. iii. p. 487.

Sphenopteridium dissectum, Göppert, sp.

Sphenopteridium dissectum.
Renault, Cours d. Botan. Foss. p. 204, pl. xxxv. fig. 6, 1883.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 488.

Cyclopteris dissecta.
Bronn, Index Palæont. p. 376.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 523, pl. xvi. figs. 25–27.
Göppert, Foss. Flora d. Übergangs. p. 161, pl. xiv. figs. 3, 4.
„ Flora d. Silur. Devon. u. Unteren Kohlenf. p. 495, pl. xxxvii. figs. 3–5.
„ Neues Jahrbuch, 1847, p. 863.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 194.
Richter and Unger, Paläont. d. Thüringer Waldes, p. 162, pl. vi. figs. 5–13.

Archæopteris dissecta.
Stur, Culm Flora, heft. i. p. 61.

Sphenopteris pachyrrachis.
Göppert, Foss. Flora d. Übergangs. p. 143, pl. xiii. fig. 3.
„ Flora d. Silur. Devon. u. Unteren Kohlenf. p. 485.
Sandberger, Vers. d. Rheinischen Schichten. Nassau, p. 428, pl. xxxix. figs. 6, 7.

Sphenopteris pachyrrachis, var. *stenophylla.*
Göppert, Foss. Flora d. Übergangs. pl. xiii. figs. 4, 5.
„ Flora d. Silur. Devon. u. Unteren Kohlenf. p. 485.

Archæopteris pachyrrachis.
Stur, Culm Flora, heft. 1, p. 64, pl. viii. figs. 8, 9.

Aneimia Tschermakii.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 104, pl. vii. figs. 2, 3.
Römer, Geol. v. Oberschlesien, p. 55.

Sphenopteris imbricata.
Ludwig, Foss. Pflanzen. paläol. Form.* p. 118, pl. xxii. fig. 3.

Archæopteris lyra.
Stur, Culm Flora, heft. 1, p. 63, pl. v. fig. 8.

Sphenopteris linearis.
Portlock, Geol. Report of Londonderry, p. 594, pl. xxxviii. figs. 7*a*, *b*.

* Palæontographica, 1869, xvii. Bd., 3 lief.

? Cardiopteris polymorpha.
Heer, Foss. Flora d. Bären Insel. p. 37, pl. xiv. figs. 1, 2.

? Asplenium transitionis.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 99, fig. 8.

Remarks.—Stur, in his Culm Flora (heft. 1, pp. 61 and 64), regards as distinct species, *Sphenopteris pachyrrachis*, Göppert, and *Sphenopteridium* (*Cyclopteris*) *dissectum*, Göppert, sp. I have carefully compared the descriptions and plates of these species with Foreign and British specimens, and am unable to find any fixed character by which they can be separated.

If we compare the figure given by Göppert in his Flora d. Silur. Devon. u. Unteren Kohlenf. (pl. xxxvii. fig. 5), with that given in his Foss. Flora d. Ubergangs (pl. xiii. fig. 3), there does not seem to exist a single point of difference.

Göppert, in his description of *Sphenopteris dissectum* (l. c. p. 495), says he believes the differences in the form of the pinnules arise from the plants having been of different ages; probably they only represent fragments from different portions of the frond; his figs. 3 and 4 being from a lower portion of the frond than his fig. 5.

I also unite here *Archæopteris lyra*, Stur. This author mentions as references to *Sphenopteridium dissectum*, Göppert, sp., the three figures given in Feistmantel's paper, "Die Kohlenkalkvorkommen bei Rothwaltersdorf," (pl. xvi., figs. 25–27), but from these Stur's figure of *A. lyra* does not seem to differ. The upper portion of Stur's figure appears identical with those given by Feistmantel, and towards the lower portion of Stur's plant we have pinnules similar to those shown by Göppert in his Flora d. Silur. Devon. u. Unteren Kohlenf. (fig. 3, pl. xxxvii.).

The pinnules on this fern vary considerably in their segmentation; the upper ones are much more deeply segmented and cleft than those on the lower portion of the frond, which are merely divided into round lobes. All these conditions can be traced in the figures cited.

Sphenopteris linearis, Portlock (non Brongt.), is evidently to be referred to this species.

The figures of *Cyclopteris dissecta*, given by Richter and Unger, are very fragmentary, it is therefore difficult to decide as to the species to which they belong.

Horizon.—Culm.

Locality.—Foreign. Silesia: Rothwaltersdorf, near Glatz.

Sphenopteridium Plantianum, Carruthers, sp.

Odontopteris Plantiana.
Carruthers, Geol. Mag. 1869, vol. vi. p. 155, pl. vi. figs. 2, 3.

Remarks.—The three specimens of this plant which were lately presented to the British Museum by C. W. Wilmot, Esq., give additional information regarding the species. One of the specimens is similar to that figured by Mr. Carruthers, but the two others show the lower portion of the frond.

The largest specimen, though incomplete in its upper part, is seven inches long and shows ten pairs of pinnules. The upper four pairs, though two of them are imperfect, show indications of lappets or lobes, which are characteristic of the upper pinnules. The pinnules towards the basal portion are simple and cyclopteroid in form and nervation, and much smaller. Those situated at the extreme base of the frond broader than long, sessile and slightly decurrent. The pinnules in this example are opposite above, but near the base they become alternate.

In the type specimens only one side of the frond is exposed, hence this character is not shown.

I have placed this fern in Schimper's genus *Sphenopteridium*, on account of the form of the upper lappeted or lobed pinnules, though the lower

pinnules have somewhat the character of *Cardiopteris*, or *Odontopteris*, in which genus Mr. Carruthers originally placed his specimens.

The fossils presented by Mr. Wilmot unfortunately do not bear any note of the locality from which they were collected.

We see in this species a similar change in the segmentation of the pinnules to that occurring in *Sphenopteridium dissectum*, Göppert, sp.

Horizon.—? Coal Measures.
Locality.—Brazil : Rio Grande do Sul (type specimens).

RHACOPTERIS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 481.

Rhacopteris elegans, Ettingshausen, sp.

Rhacopteris elegans.
Renault, Cours d. Botan. Foss. p. 200, pl. xxxiii. fig. 20, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 482.

Asplenites elegans.
Andrae, Neues Jahrbuch, 1864, p. 167.
Ettingshausen, Steinkohlf. v. Stradonitz, p. 15, pl. iii. figs. 1–3, pl. iv.

Sphenopteris asplenites.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 281.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 300.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 17, pl. xxiv. fig. 6.

Eremopteris elegans.
Lesquereux, Coal Flora of Pennsyl. p. 294, pl. liii. fig. 7.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia : Stradonitz.

Rhacopteris Geikiei, Kidston, sp.

Sphenopteris Geikiei.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 535, pl. xxx. fig. 5, pl. xxxi. fig. 9.

Remarks.—The Collection contains a fine specimen from Glencartholm, which is 14 inches long, but only attains a width of rather less than 1½ inches at its broadest part.
Horizon.—Cement-stone Group, Calciferous Sandstone Series (Culm.).
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

Rhacopteris flabellata, Tate, sp.

Sphenopteris flabellata.
Tate, in Johnston's Botany of the Eastern Borders, p. 308, fig. 3, 1853.

Noeggerathia, sp.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 32, pl. ii. figs. 1, 2, 1865.

Remarks.—This species was described from a very fragmentary specimen, which showed only a small part of a pinnule, but it gives the characters sufficiently clearly to enable one satisfactorily to identify the Burdiehouse fossil as the same species.
Description.—Pinnæ alternate, pinnæ segmentation unilateral, segments, linear, narrow, one vein passing into each lobe. Rachis thin.

The plant described by Gomes as *Noeggerathia*, sp., appears indistinguishable from *Rhacopteris flabellata*, Tate, sp.

Schimper* unites Gomes' plant with *Rhacopteris elegans*, but this latter

* Traité d. Paléont. Végét. vol. i. p. 482.

species has rhomboidal pinnæ, and the pinnæ segmentation is equilateral and much more numerous than in *Rhacopteris flabellata* and *Noeggerathia*, sp. Gomes, where it is unilateral.

It also differs from *Rhacopteris Geikiei* in its unilateral segmentation, in its pinnule-cutting being narrower and longer, and in its more slender rachis.

Horizon.—Calciferous Sandstone Series (Culm).
Locality.—British. Midlothian : Burdiehouse, near Edinburgh.

RENAULTIA, Zeiller, 1883.

Ann. des Scienc. Nat. 6e. Série. Bot. Tome xvi. p. 185.

Renaultia microcarpa, Lesquereux, sp.

Renaultia (Sphenopteris) microcarpa.
Zeiller, Ann. d. Scienc. Nat. 6e sér. Bot. vol. xvi. p: 186.

Sphenopteris microcarpa.
Kidston, Annals and Mag. Nat. Hist. 5th ser. vol. x. p. 9, pl. 1 figs. 7–14.
„ Trans. Roy. Phys. Soc. Edinb. vol. vii. p. 131, pl. 1 figs. 7–14.
Lesquereux, Coal Flora of Pennsyl. p. 280, pl. xlvii. fig. 2.

Remarks.—The fruit of this species was first observed by Lesquereux, but more fully figured and described by myself from specimens collected by Mr. James Bennie from the Coal Measures, Dysart, Fife. The sporangia are exannulate, and its affinities with recent genera are very obscure.

Horizon.—Coal Measures.
Localities.—British. Lanarkshire : Carluke. (Presented by the British Association). Lancashire : St. Helen's, near Liverpool.

OLIGOCARPIA, Göppert, 1841.

Die Gattungen der Fossilen Pflanzen, Lief. i. p. 3.

Oligocarpia formosa, Gutbier, sp.

Oligocarpia formosa.
Zeiller, Ann. d. Scienc. Nat. 6e sér. Bot. vol. xvi. p. 190, pl. x. figs. 6–12.
„ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 194.

Sphenopteris formosa.
Boulay, Terr. Houil. du Nord de la France, p. 27.
Bronn, Index Palæont. p. 1168.
Geinitz, Gaea v. Sachsen, p. 75.
„ Vers. d. Steink. in Sachsen, p. 14, pl. xxiii. figs. 7–9.
Giebel, Deutschl. Petrefacten, p. 43.
Gutbier, Vers. d. Zwickau Schwarzk. p. 41, pl. iv. fig. 12.
Schimper, Traité d. Paléont. Végét. vol. i. p. 385.
Sternberg, Vers. ii. p. 129.
Unger, Synop. Plant. Foss. p. 66.
„ Genera et Species, p. 122.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 79, 1868.
„ Flora d. jüng. Steink. u. d. Rothl. p. 54.
Zeiller, Flore Houil. des Asturies, p. 4.

Sphenopteris laciniata.
Bronn, Index Palæont. p. 1169.
Geinitz, Gaea v. Sachsen, p. 75.
Giebel, Deutschl. Petrefacten, p. 43.
Gutbier, Vers. d. Zwickau Schwarzk. p. 76, pl. xi. fig. 4.

Sternberg, Vers. ii. p. 129.
Unger, Synop. Plant. Foss. p. 66.
„ Genera et Species, p. 122.

Remarks.—Sphenopteris formosa, Roehl (Foss. Flora d. Steink.-Form Westphalens, p. 57, pl. xv. figs. 11 and 13, and pl. xvi. fig. 9), is *Sphenopteris stipulata*, Gutbier, but Roehl's *Sphenopteris stipulata* (*loc. cit.* pl. xvi. fig. 6*a*,) is not Gutbier's plant of that name.

The fruit of *Sphenopteris formosa* has been described by Zeiller, who has shown that it must now be placed in Göppert's Genus *Oligocarpia*.

Horizon.—Coal Measures.

Locality.—Foreign. Bohemia.

URNATOPTERIS, Kidston, 1884.

Quart. Journ. Geol. Soc. vol. xl. p. 594.

Urnatopteris tenella, Brongniart, sp.

Urnatopteris tenella.
Kidston, Quart. Journ. Geol. Soc. vol. xl. p. 594.

Sphenopteris tenella.
Brongniart, Hist. d. Végét. Foss. p. 186, pl. xlix. fig. 1.
Lebour, Catalogue of Hutton Collection, p. 108, Newcastle-on-Tyne.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 861.
Unger, Synop. Plant. Foss. p. 61 (excl. syn. *S. cysteoides*, L. and H.)
„ Genera et Species, p. 112 (excl. syn. *S. cysteoides*, L. and H.)
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 56.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 79, 1868.

Cheilanthites tenellus.
Göppert, Syst. Fil. Foss. p. 240.

Sphenopteris lanceolata.
Williamson, Proc. Roy. Instit. Great Brit., 1883, vol. x. pt. 2, p. 225, fig. 6*a*.

Sphenopteris multifida.
Lindley and Hutton, Fossil Flora, vol. ii. pl. cxxiii.
Morris, Trans. Geol. Soc. 2nd sér. vol. v. p. 488.
Sauveur, Végét. Foss. de la Belgique, pl. xxiii. figs. 3, 4.

Sphenopteris delicatula.
Brongniart, Hist. d. Végét. Foss. p. 185, pl. lviii. fig. 4.
Sauveur, Végét. Foss. de la Belgique, pl. xxiii. fig. 5, pl. xxv. fig. 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 415.

Trichomanites delicatulus.
Giebel, Deutschl. Petrefacten, p. 47.
Göppert, Syst. Fil. Foss. p. 267.
Unger, Synop. Plant. Foss. p. 72.
„ Genera et Species, p. 134.

Hymenophyllites delicatulus.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 412 (gives as ref. Brongniart, pl. lviii. fig. 4).

Rhodea delicatula.
Sternberg, Vers. ii. p. 111.

Eusphenopteris tenella.
Kidston, Trans. Roy. Phys. Soc. Edinb. vol. vii. p. 129, pl. i. figs. 1–6.
„ Annals and Mag. Nat. Hist. 5th ser. vol. x. p. 7, pl. i. figs. 1 6.

Sphenopteris, sp.
Lebour, Illustrations of Fossil Plants, p. 79, pl. xxxix.

Remarks.—The specimen figured by Brongniart (Hist. de Végét. Foss. pl. xlix. fig. 1) is in the Collection. No more definite locality for the specimen is known than "Yorkshire."
Horizon.—Coal Measures.
Locality.—British. Yorkshire.

ZEILLERIA, Kidston, 1884.
Quart. Journ. Geol. Soc. vol. xl. p. 590.

Zeilleria delicatula, Sternberg, sp.

Zeilleria delicatula.
Kidston, Quart. Journ. Geol. Soc. vol. xl. p. 592, pl. xxv.
Sphenopteris delicatula.
Brongniart, Prodrome, p. 50.
Sternberg, Vers. i. fasc. 2, p. 30, pl. xxvi. fig. 5; fasc. 4, p. xvi.
Sphenopteris meifolia.
Feistmantel, Steink. u. Perm.-Ablager. p. 74.
Giebel, Deutschl. Petrefacten, p. 40.
Schimper, Traité d. Paléont. Végét. vol. i. p. 383.
Sternberg, Vers. ii. p. 56, pl. xx. fig. 5.
Stur, Jahrbuch d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 61.
„ Genera et Species, p. 112.
Cheilanthites meifolius.
? Ettingshausen, Steinkohlf. v. Radnitz, p. 36, pl. xviii. fig. 3.
Göppert, Syst. Fil. Foss. p. 241.
„ (*var. trifidus*), Syst. Fil. Foss. p. 241, pl. xv. figs. 3, 4.
Horizon.—Coal Measures.
Locality.—British. Worcestershire: Forest of Wyre.
Foreign. Russia: Koslov, Black Sea. (Presented by Captain Spratt, R.N.)

CALYMMATOTHECA, Stur, 1877 (emend.).*
Culm Flora, heft 2, p. 149.

Calymmatotheca affinis, Lindley and Hutton, sp.

Sphenopteris affinis.
Bronn, Index Palæont. p. 1167.
Hibbert, Trans. Roy. Soc. Edinb. vol. xiii. p. 178, pl. vi. fig. 4, and pl. v. *bis.*
Lindley and Hutton, Foss. Flora, vol. i. pl. xlv.
Peach, Quart. Journ. Geol. Soc. vol. xxxiv. p. 131, pl. vii.
„ Trans. Bot. Soc. Edinb. vol. xii. pp. 162 and 187.
Sternberg, Vers. ii. p. 57 (excl. syn. *S. crithmifolia*, L. and H.).
Diplothmema affine.
Stur, Culm Flora, heft 2, p. 230.
Sphenopteris linearis.
Brongniart, Hist. d. Végét. Foss. p. 175, pl. liv. fig. 1.
Bronn. Index Palæont. p. 1169 (excl. ref. Sternb.).
Hibbert, Trans. Roy. Soc. Edinb. vol. xiii. p. 178, pl. vi. fig. 3.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 535.
Lesquereux, Coal Flora in Pennsyl. p. 290.
Schimper, Traité d. Paléont. Végét. Foss. vol. i. p. 387.

* *Calymmatotheca*, Zeiller (see footnote, Ann. Sci. Nat. 6e ser. Bot. vol. xvi. p. 182).

Cheilanthites linearis.
Göppert, Syst. Fil. Foss. p. 232, pl. xvi. (excl. ref. Sternb.).

Staphylopteris (?) Peachii.
Peach, Quart. Journ. Geol. Soc. vol. xxxiv. p. 131, pl. viii.
„ Trans. Bot. Soc. Edinb. vol. xiii. p. 46.

Sphenopteris frigida.
Heer (*in part*), Foss. Flora Spitzbergens, pl. i. fig. 2.

Sphenopteris flexilis.
Heer (*in part*), Foss. Flora Spitzbergens, p. 8, pl. i. figs. 11–27 (pl. ii. figs. 7–10 ?).

Remarks.—The plant figured by Brongniart as *Sphenopteris linearis* is certainly not Sternberg's* fern of that name. The specimen that has served as the type of Sternberg's *S. linearis* is so imperfect, that from any evidence afforded by the figure it is very improbable we shall ever know what his fern really is.

Feistmantel† gives a figure of what he believes to be Sternberg's plant, which, from the little that can be learnt from Sternberg's figure, agrees with it pretty well; but Feistmantel's fern may be only one of the many forms of *Eremopteris artemisiæfolia.*

One thing, however, is clear, whatever Sternberg's species may be, that figured under the same name by Brongniart is an altogether different plant. On the other hand, the plant figured by Brongniart as *S. linearis* is the same as that figured by Lindley and Hutton as *S. affinis.* This fern is extremely common in the Calciferous Sandstone Series of Scotland, and I have examined a great many beautiful examples from the neighbourhood of Edinburgh.

The size of the pinnules varies considerably, from even smaller than those shown on the figure given by Lindley and Hutton to the size of those figured by Brongniart. These forms merge into each other by insensible gradations, so the identity of *S. linearis*, Brongt., and *S. affinis*, L. and H., is undoubted; hence I have placed the former as a synonym of the latter.

The fruit of *S. affinis* has been described by Mr. C. W. Peach under the name of *Staphylopteris Peachii*, Balf. and Eth. Jr., and a Note on a specimen showing the so-called *Staphylopteris Peachii* attached to *S. affinis* formed the subject of a communication to the Botanical Society of Edinburgh (Trans. vol. xii. p. 187).

The main axis of this fern dichotomises and the pinnæ are borne on the two forks of the dichotomy. This species, in so far as the barren frond is concerned, agrees with Stur's *Diplothmema*, but its fruit removes it from this too comprehensive genus, and places it in his *Calymmatotheca.*

On a specimen in the Collection from the Calciferous Sandstone Series of the Island of Arran, Firth of Clyde, the fronds are shown to spring from a caudex. The specimen is, unfortunately, in a very imperfect state of preservation.

I have examined the specimen from which the plate of Lindley and Hutton's *S. linearis* was drawn.‡ Their plant is not the *S. linearis*, Brongt., but a very fine specimen of the upper portion of a frond of their *Sphenopteris crassa.*§ The drawing is not a good representation of the fossil, which is preserved in the "Hutton Collection" at Newcastle-on-Tyne.

Sphenopteris frigida, Heer (l. c. pl. i. fig. 2), and *Sphenopteris flexilis* of the same author (l. c. pl. i. figs. 11–27), I believe to be merely fragments of *S. affinis.*

The small specimen of fruit, which I identified as *Staphylopteris Peachii*,

* Sternberg, Vers. ii. p. 15, pl. xlii. fig. 4.
† Palæontographica, vol. xxiii. pl. lxv. fig. 1.
‡ Foss. Flora, vol. iii. p. ccxxx.
§ Kidston in Proc. Royal Phys. Soc. Edinb. vol. vii. p. 238.

from Glencartholm[1] is inaccurately determined. I now find that all the specimens which I named *S. Peachii* from that locality are the fruit of *Calymmatotheca bifida*, L. and H., sp., to which I have recently seen this fruit attached.

Horizon.—Calciferous Sandstone Series.
Localities.—British. Buteshire: Island of Arran. Dumfriesshire: Glencartholm, Eskdale. Midlothian: Burdiehouse, near Edinburgh; Wardie, near Granton.

Calymmatotheca bifida, Lindley and Hutton, sp.

Sphenopteris bifida.
Hibbert, Trans. Roy. Soc. of Edinb. vol. xiii. p. 177, pl. vi. figs. 1–2.
Kidston, Trans. Roy. Soc. of Edinb. vol. xxx. p. 537.
Lindley and Hutton, Foss. Flora, vol. i. pl. liii.
Schimper, Traité d. Paléont. Végét. vol. i. p. 412.
Sternberg, Vers. ii. p. 60.

Trichomanites bifidus.
Bronn, Index Palæont. p. 1278.
Göppert, Syst. Fil. Foss. p. 264, pl. xv. fig. 11.
" Flora d. Silur. Devon. u. Unter. Kohlenf. p. 492.
Unger, Synop. Plant. Foss. p. 72.
" Genera et Species, p. 134.

Todea Lipoldi.
Peach, Trans. Bot. Soc. Edinb. vol. xiii. p. 47.
Renault, Cours d. Botan. Foss. p. 193, pl. xxxiii. fig. 11, 1883.
Stur, Culm Flora, heft 1, p. 71, pl. xi. fig. 8, heft 2, p. 291.

Staphylopteris Peachii.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 539, pl. xxxi. fig. 6.

Sphenopteris frigida.
Heer, Foss. Flora Spitzbergens, p. 6, pl. i. figs. 1, 3–6.

? Sphenopteris geniculata.
Heer, Foss. Flora Spitzbergens, p. 7, pl. i. figs. 8 and 10 (figs. 7–9 ?).

Remarks.—The evidence upon which *Sphenopteris bifida* is now placed in *Calymmatotheca* will be found in the remarks appended to *C. affinis*.
The figures of *Sphenopteris frigida* and *S. geniculata*, Heer, mentioned in the above synonymy, are, I believe, only fragmentary specimens of this species.
Horizon.—Calciferous Sandstone Series.
Locality.—British. Midlothian: Burdiehouse, near Edinburgh.

SPHENOPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.

Sphenopteris obtusiloba, Brongniart.

Sphenopteris obtusiloba.
Boulay, Terr. Houil. du Nord. de la France, p. 26.
Brongniart, Hist. d. Végét. Foss. p. 204, pl. liii. fig. 2*.
Bronn, Index Palæont, p. 1170.
? Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 156.
? " Canadian Nat. vol. viii. p. 445.
Ettingshausen, Steinkf. v. Radnitz, p. 37, pl. xxi. fig. 2.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 594 and 597.
" Vers. d. Böhm. Kohlenab. p. 279.

[1] Trans. Roy. Soc. Edinb. vol. xxx. pl. xxxi. fig. 6.

Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, and 300.
„ Steink. u. Perm.-Ablager. p. 73.
„ Steink. v. Kralup. in Böhmen, pp. 11 and 20.
Giebel, Deutschl. Petrefacten, p. 42.
Lesquereux, Report Geol. Survey of Illinois, vol. ii. p. 435.
Morris, Trans. Geol. Soc. 2 ser. vol. v. p. 488.
Renault, Cour de Botan. Foss. p. 190, pl. xxxiii. figs. 5 and 6, 1883.
Roehl, Foss. Flora d. Steink.-Form Westphalens, p. 55, pl. xvi. figs. 10, 11 (pl. xxix. fig. 9 ?).
Sauveur, Végét. Foss. de la Belgique, pl. xv. fig. 2 (excl. pl. xvi. fig. 3, and pl. xxv. fig. 1).
Schimper, Traité d. Paléont Végét. vol. i. p. 399, pl. xxx. fig. 1.
Sternberg, Vers. ii. p. 63.
Stur, Jahrbuch, d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, and 143.
Unger, Synop. Plant. Foss. p. 64.
„ Genera et Species, p. 116.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 78, 1868.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 47 (excl. ref. Andrae).
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. xii. p. 191.
„ Végét. Foss. du Terr. Houil. p. 39, pl. clxii. figs. 1–2.

Cheilanthites obtusilobus.
Göppert, Syst. Fil. Foss. p. 246.

Diplothmema obtusilobum.
Stur, Culm Flora, heft 2, p. 230.

Sphenopteris irregularis.
Andrae, Vorwelt. Pflanzen, p. 24, pl. viii. and pl. ix. fig. 1.
„ Neues Jahrbuch, 1864, p. 167.
Boulay, Terr. Houil. du Nord. de la France, p. 26.
Crépin, Bull. Soc. Roy. Botan. Belgique, vol. xx. part ii. pp. 30 and 31.
Ettingshausen, Steinkf. v. Radnitz, p. 38.
Feistmantel, Der Hangendflötzzug, p. 71.
Lebour, Illustrations of Fossil Plants, p. 61, pl. xxx. *(var.)*.
Lesquereux, Report Geol. Survey of Illinois, vol. ii. p. 435.
Roehl, Foss. Flora d. Steink.-Form Westph. p. 56, pl. xvi. fig. 2, pl. xxxi. figs. 5, 6.
Römer, Palaeontographica, vol. ix. p. 24, 1862.
Sandberger, Flora d. Ober. Steink. im Badischen Schwarz. pp. 2 and 5.
Schimper, Traité d. Paléont. Végét. vol. i. p. 373.
Sternberg, Vers. ii. p. 63, pl. xvii. fig. 4, and p. 152, pl. ix. fig. 7.
Stur, Jahrbuch d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 64.
„ Genera et Species, p. 116.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 78, 1868.

Pseudopecopteris irregularis.
Lesquereux, Coal Flora in Pennsyl. p. 211, pl. lii. fig. 1–3*b*, and fig 8.

Cheilanthites irregularis.
Göppert, Syst. Fil. Foss. p. 247.

Diplothmema irregulare.
Stur, Culm Flora, heft 2, p. 230.

Sphenopteris trifoliolata.
Brongniart, Hist. d. Végét. Foss. p. 202, pl. liii. fig. 3 (excel. ref.).
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 75.
Giebel, Deutschl. Petrefacten, p. 42.

Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 410.
Sauveur, Végét. Foss. de la Belgique, pl. xix. fig. 2, and pl. xxi.
Unger, Synop. Plant. Foss. p. 63 (*in part*).
„ Genera et Species, p. 116 (*in part*).

Pseudopecopteris trifoliolata.
Lesquereux, Coal Flora in Pennsyl. p. 217.

Sphenopteris latifolia.
Lindley and Hutton, Foss. Flora, vol. ii. pl. clvi., vol. iii. pl. clxxviii.

Pecopteris, sp. (=*Sphenopteris irregularis.*)
Crépin, Bull. Soc. Roy. Botan. Belgique, vol. xx. part ii., pp. 24 and 25.

? Sphenopteris botryoides.
Ettingshausen, Steinkf. v. Radnitz. p. 38.
Schimper, Traité d. Paléont. Végét. vol. i. p. 373.
Sternberg, Vers. ii. p. 63.
Stur, Jahrbuch d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 64.
„ Genera et Species, p. 117.

? Cheilanthites botryoides.
Göppert, Syst. Fil. Foss. p. 247.

? Diplothmema botryoides.
Stur, Culm Flora, heft 2, p. 230.

? Pecopteris venusta.
Sternberg, Vers. i. fasc. iv. p. 19, pl. xxvi. fig. 1.

Remarks.—Crépin,* who has carefully examined *Sphenopteris nummularia*, Gutbier, *S. convexiloba*, Schimper, *S.* (*Pecopteris*) *neuropteroides*, Boulay, and *S. trifoliolata*, Artis, sp., thinks that these may be found eventually to be all varieties of *S. irregularis* Sternb., which last-mentioned species has been shown by Zeiller† to be identical with *S. obtusiloba*, Brongt.

Gutbier‡ gives as a synonym to his *Sphenopteris nummularia*, the plant figured by Lindley and Hutton as *S. latifolia*,§ Brongt., but Lindley and Hutton's plant is now generally recognised as *S. obtusiloba*, Brongt. (=*S. irregularis*, Sternb.). Gutbier also further states on p. 75 of the same work that he is strongly inclined to regard *S. irregularis*, Sternb., as only a variety of *S. nummularia* with somewhat irregular pinnules.

Geinitz‖ accepts this view, and unites *S. nummularia*, Gutbier, with *S. irregularis*, Sternb. I have, however, kept separate from *S. obtusiloba*, Brongt., *S. nummularia*, Gutbier, but followed Zeiller¶ in uniting with the last-mentioned fern *S. convexiloba*, Schimper.

Subsequent investigations may show *S. nummularia*, *S. convexiloba*, *S. neuropteroides*, and *S. trifoliolata* to be only forms of *S. obtusiloba ;* but from what is at present known, I think we must regard as distinct species, *S. obtusiloba*, *S. nummularia*, and *S. neuropteroides*.

In the references I have excluded *S. obtusiloba*, mentioned by Göppert in his Foss. Flora d. Silur. Devon. u. Unter Kohlenformation (p. 487), as it is probable that a specimen of *S. foliolata*, Stur, or *S. distans*, Sternb., has been in this case mistaken for *S. obtusiloba*, Brongt.

S. distans has already been identified in error by Ettingshausen** as *S. obtusiloba*, and as imperfect specimens of *S. foliolata* and *S. distans*

* Bull. Soc. Roy. de Botan. de Belgique, vol. xx. part ii. p. 31.
† Végét. Foss. du Terr. Houil. de la France, p. 40.
‡ Vers. d. Zwick. Schwarzkohl. p. 43.
§ Foss. Flora, pl. clvi.
‖ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 192.
¶ Vers. d. Steinkf. in Sachsen, p. 14.
** Foss. Flora d. Mähr-Schlesischen Dachsch. p. 22, fig. 6.

might easily be mistaken for *S. obtusiloba*, its occurrence in the Culm requires corroboration.

Horizon.—Coal Measures.

Localities.—*British.* Northumberland : Fawdon Colliery ; near Newcastle-on-Tyne.

Foreign. Bohemia : Radnitz.

Sphenopteris nummularia, Gutbier.

Sphenopteris nummularia.

Andrae, Vorwelt. Pflanzen, p. 35, pl. xi.
Boulay, Terr. Houil. du Nord de la France, p. 25.
Bronn, Index Palæont. p. 1170.
Crépin, Bull. Soc. Roy. Botan. Belgique, vol. xx. part ii. p. 31.
Gutbier, Vers. d. Zwick. Schwarzk. pp. 43, and 75, pl. iv. fig. 5, pl. x. figs. 7–8, pl. xi. fig. 3.
Heer, Flora Foss. Helv. lief. 1, p. 14, pl. i. fig. 8, pl. xiv. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. i. p. 374.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 78.
Zeiller, Bull. Soc. Géol. de France, 3e sér. vol. xii. p. 192.

Sphenopteris irregularis.

Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, p. 14, pl. xxiii. figs. 2, 3, 4.
Heer, Urwelt der Schweiz. p. 10, pl. i. fig. 4.

Sphenopteris convexiloba.

Boulay, Terr. Houil. du Nord de la France, p. 25, pl. ii. fig. 7.
Schimper, Traité d. Paléont. Végét. vol. i. p. 372.

Diplothmema nummularium.

Stur, Culm Flora, heft 2, p. 230.

Remarks.—For notes on this species, see the remarks appended to *Sphenopteris obtusiloba*, Brongt.

Horizon.—Coal Measures.

Localities.—*British.* Northumberland : Felling Colliery, near Newcastle-on-Tyne.

Foreign. Silesia : Waldenburg.

Sphenopteris trifoliolata, Artis, sp.

Sphenopteris trifoliolata.

Andrae, Vorwelt. Pflanzen, p. 28, pl. ix. figs. 2, 3, 4.
Boulay, Terr. Houil. du Nord de la France, p. 26.
Brongniart, Prodrome, p. 51.
Bronn, Index Palæont. p. 1171.
Renault, Cours d. Botan. Foss. p. 192, pl. xxxiii. fig. 8, 1883.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 65 (pl. xvi. figs. 3 & 16 ?).
Schimper, Traité d. Paléont. Végét. vol. i. p. 371 (excl. ref. Brongt.).
Sternberg, Vers. ii. p. 63 (excl. ref. Brongt.).
Unger, Synop. Plant. Foss. p. 63 (excl. ref. Brongt.).
„ Genera et Species, p. 115 (excl. ref. Brongt.).
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 78.
Zeiller, Bull. Soc. Géol. de France, 3e sér. vol. xii. p. 192.

Cheilanthites trifoliolatus.

Göppert, Syst. Fil. Foss. p. 245 (*in part*).

Filicites trifoliolatus.

Artis, Antedil. Phytol. pl. xi.
Crépin, Bull. Soc. Roy. Bot. de Belgique, vol. xx. part. ii. p. 31.

Sphenopteris dilatata.
Lindley and Hutton, Fossil Flora, vol. i. pl. xlvii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.

Cyclopteris dilatata.
Sternberg, Vers. ii. pp. 66 & 135.
Unger, Synop. Plant. Foss. p. 56.
„ Genera et Species, p. 100.

Cyclopteris triloba.
Bronn, Index Palæont. p. 377.

Adiantites trilobus.
Göppert, Syst. Fil. Foss. p. 225.

Diplothmema dilatatum.
Stur, Culm Flora, heft 2, p. 230.
Parkinson, Organic Remains, vol. i. pl. v. fig. 2 ?

Remarks.—*Sphenopteris trifoliolata*, Brongt. (Hist. d. Végét. Foss. p. 202, pl. liii. fig. 3), is equivalent to his *S. obtusiloba*, and that form of it which Sternberg named *S. irregularis* (Vers. ii. p. 63, pl. xvii. fig. 4).

Horizon.—Coal Measures.

Localities.—*British.* Lanarkshire : Wishaw. Northumberland : Newcastle-on-Tyne. Shropshire : Madeley Court (Presented by H. Pearce, Esq.).

Sphenopteris Sauveurii, Crépin.

Sphenopteris Sauveurii.
Crépin, Bull. Soc. Roy. Bot. de Belgique, vol. xix. part ii. p. 17. vol. xx. part ii. p. 26.

Sphenopteris obtusiloba.
Andrae, Vorwelt. Pflanzen, p. 32, pl. x. (excl. refs.).

Sphenopteris elegans.
Sauveur, Végét. Foss. de la Belgique, pl. xviii. fig. 3.

? Sphenopteris polyphylla.
Lindley & Hutton, Foss. Flora, vol. ii. p. 147.

Remarks.—There is little doubt in my mind as to *Sphenopteris polyphylla*, L. & H., being the same plant as those identified in error by Andrae as *S. obtusiloba*, Brongt., and subsequently named *Sphenopteris Sauveurii*, by Crépin.

Unfortunately the type of Lindley & Hutton's plant seems to be lost; so in the meantime, *S. polyphylla* is placed in doubt under *S. Sauveurii*, Crépin, but should Lindley & Hutton's fern prove to be the same plant as *S. obtusiloba*, Andrae (*non* Brongt.), their name, *S. polyphylla*, must be substituted for *S. Sauveurii*.

Between Lindley & Hutton's plate and fig. 1 of Andrae's plate x., it is difficult to fix on any character by which these two species can be separated.

Horizon.—Coal Measures.

Localities.—*British.* Worcestershire : Tipton, near Dudley.
Foreign. Rhenish Prussia : Saarbrück.

Sphenopteris Schillingsii, Andrae.

Sphenopteris Schillingsii.
Andrae, Vorwelt. Pflanzen, p. 22, pl. vii. fig. 1.
Boulay, Terr. Houil. du Nord de la France, p. 26.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 64, pl. xv. fig. 1, pl. xxx. fig. 12.
Schimper, Traité d. Paléont. Végét. vol. i. p. 400.
Zeiller, Bull. Soc. Géol. de France, 3e sér. vol. xii. p. 192.

? ? Diplothmema Schillingsii.
Stur, Culm Flora, heft 2, pp. 230 & 253, pl. xv. fig. 6.

Sphenopteris obtusiloba.
Sauveur, Végét. Foss. de la Belgique, pl. xvi. fig. 3.

Horizon.—Coal Measures.
Locality.—British. Lanarkshire : Airdrie.

Sphenopteris adiantoides, Lindley & Hutton.

Sphenopteris adiantoides.
Dawson, Quart. Journ. Geol. Soc. vol. xv. p. 69, 1859.
Lindley & Hutton, Foss. Flora, vol. ii. pl. cxv.
Schimper, Traité d. Paléont. Végét. vol. i. p. 401.

Cyclopteris adiantoides.
Bronn, Index Palæont. p. 377.
Sternberg, Vers. ii. p. 133.

Diplothmema adiantoides.
Stur, Culm Flora, heft 2, p. 230.

Adiantites concinnus.
Göppert, Syst. Fil. Foss. p. 226.

Cyclopteris concinna.
Unger, Synop. Plant. Foss. p. 56.
„ Genera et Species, p. 101.

Sphenopteris obtusiloba.
Sauveur, Végét. Foss. de la Belgique, pl. xxv. fig. 1.

Horizon.—Coal Measures.
Locality.—British. Durham : Jarrow Colliery.

Sphenopteris Zobelii, Göppert, sp.

Sphenopteris Zobelii.
Schimper, Traité d. Palæont. Végét. vol. i. p. 404.

Hymenophyllites Zobelii.
Bronn, Index Palæont. p. 602.
Giebel, Deutschl. Petrefacten, p. 46.
Göppert, Syst. Fil. Foss. p. 260, pl. xxxvi. figs. 3, 4.
„ Gatt. d. Foss. Pflanzen, lief. 3 u. 4, p. 55, pl. v. fig. 3.
Stur, Verh. d. k. k. Geol. Reichsanst. p. 300, 1874.
Unger, Synop. Plant. Foss. p. 69.
„ Genera et Species, p. 129.

Rhodea Zobelii.
Sternberg, Vers. ii. p. 110.

Diplothmema Zobelii.
Stur, Culm Flora, heft 2, p. 230.
„ Morph. u. Syst. d. Culm u. Carbonfarne, p. 194.

Remarks.—The specimen from Dalkeith shows very well the characters of this species. Probably it only represents a lateral pinna, with a similar mode of growth to the pinnæ of *Mariopteris latifolia* and *M. nervosa*, as figured by Zeiller (Bull. Soc. Géol. de France, 3e sér. vol. vii. pp. 4 & 5.)

The fossil shows a portion of a secondary rachis about 2½ inches long and the tenth of an inch broad. At its summit it bifurcates, the two forks forming a very obtuse angle. The leafbearing pinnæ spring from the two arms of the bifurcation; these latter are flexuous and strongly geniculate where the pinnæ are given off. Neither of the arms of the bifurcation is complete, but the more perfect of the two is 5 inches long. The ultimate pinnæ are

lanceolate and alternate. The pinnules are also alternate and rhomboidal, their basal extremity forming a thick foot-stalk, which is strongly winged, the wing running down the sides of the rachis. The lower pinnules are cut into three cuneate lobes, which in turn are divided into sharp teeth. The pinnules on the upper part of the pinnæ are also rhomboidal with deeply-toothed margins; towards the apex of the pinnæ they become confluent. The veins are numerous and radiate from the base of the pinnule, a veinlet extending into each of the marginal teeth.

Horizon.—Coal Measures.
Localities.—*British.* Midlothian : Dalkeith.
Foreign. Bohemia.

Sphenopteris anthriscifolia, Göppert.

Sphenopteris anthriscifolia.
Göppert, in Tchihatcheff's Voyage dans l'Altaï, p. 387, pl. xxviii. fig. 9.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 467.
Unger, Genera et Species, p. 122.

Horizon.—"Carboniferous."
Locality.—*Foreign.* Russia : Village Mérétsxoia, Salaviok.

Sphenopteris imbricata, Göppert.

Sphenopteris imbricata.
Göppert, in Tchihatcheff's Voyage dans l'Altaï, p. 387, pl. xxix. figs. 10–13.
Schimper, Traité d. Paléont. Végét. vol. i. p. 398, vol. iii. p. 467.
Unger, Genera et Species, p. 123.

Horizon.—"Carboniferous."
Locality.—*Foreign.* Russia : River Inia, Altaï.

Sphenopteris cristata, Brongniart.

Sphenopteris cristata.
Bronn, Index Palæont. p. 1167.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Giebel, Deutschl. Petrefacten, p. 45.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 12.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 60.
Lesquereux, Coal Flora of Pennsyl. p. 273.
Schimper, Traité d. Paléont. Végét. vol. i. p. 397.
Sternberg, Vers. ii. p. 131.
Unger, Synop. Plant. Foss. p. 68.
„ Genera et Species, p. 125.

Pecopteris cristata.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 356, pl. cxxv. figs. 4–5.
Renault, Cours d. Botan. Foss. p. 125, 1883.

Remarks.—The Collection contains a fine specimen from Camerton. It is about 7 inches long, and at its broadest part about 6 inches wide. The pinnæ are alternate, lanceolate; the basal and longest pinna measures 3 inches in length, and at its base fully 1¼ inches wide. The pinnules on the lower side of the pinna are longer than those on the upper side. The pinnules are alternate, lobed, the lobes being again more or less dentate. On the upper portion the pinnæ are almost oblong, pinnules confluent, the lower one with about three teeth. The pinnules appear to have been recurved, as their outline is seldom clearly seen, the greater majority of them having their margins embedded in the matrix. The lower basal pinnule has a large lobe directed to the main axis, which is moderately thick.

The veins are strongly marked and almost impart a wrinkled appearance

to the pinnules, but with the exception of the central vein, their full course is seldom traceable.

This species is closely related to *Sphenopteris chærophylloides*, Brongt. sp., and in the specimen from Camerton, some of the pinnules on the lower part of the frond are more deeply segmented than in the enlarged drawing of *Sphenopteris cristata*. In fact, this example is somewhat intermediate in its character between *S. cristata* and *S. chærophylloides*.

Horizon.—Upper Coal Measures.
Locality.—British. Somersetshire: Camerton.

Sphenopteris Hœninghausi, Brongniart.

Sphenopteris Hœninghausi.
Andrae, Vorwelt. Pflanzen, p. 13, pls. iv., v.
Boulay, Terr. Houil. du Nord de la France, p. 26.
Brongniart, Prodrome, p. 51.
„ Hist. d. Végét. Foss. p. 199, pl. lii.
Bronn, Index Palæont. p. 1168.
Ettingshausen, Die Steinkf. v. Radnitz, p. 37.
Feistmantel, Zeitsch d. Deut. Geol. Gesell. vol. xxv. pp. 594 and 597.
„ Vers. d. Böhm. Kohlenab. p. 279, pl. lxv. fig. 2.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 300.
„ Steinkohl. u. Perm.-Ablager. p. 74.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 39.
„ Vers. d. Steinkf. in Sachsen, p. 14, pl. xxiii. figs. 5–6.
„ Jahrb. d. k. k. Geol. Reichsanst. p. 350, 1857.
Giebel, Deutschl. Petrefacten, p. 42.
Lesquereux, Coal Flora of Pennsyl. p. 288, pl. lv. fig. 5.
Renault, Cours d. Botan. Foss. p. 191, pl. xxxii. 1883.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 54, pl. xiv. fig. 8, pl. xiii. fig. 3.
Römer, Palaeontographica, vol. ix. p. 22, 1862.
Sauveur, Végét. Foss. de la Belgique, pl. xxii. fig. 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 385.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141 and 142.
Unger, Synop. Plant. Foss. p. 63 (excl. syn. L. & H.).
„ Genera et Species, p. 115 (excl. syn. L. & H.).
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 78.
Zeiller, Végét. Foss. du Terr. Houil. p. 41, pl. clxii. figs. 4–5.
„ Bull. Soc. Géol. de France, 3e sér. vol. xii. p. 193.

Cheilanthites Hœninghausi.
Göppert, Syst. Fil. Foss. p. 244.

Calymmotheca Hœninghausi.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 174.

Sphenopteris asplenioides.
Brongniart, Prodrome, p. 51.
„ Hist. d. Végét. Foss. p. 214.
Sternberg, Vers. i. fasc. 4, p. xvi.; ii. p. 62.

Sphenopteris trifoliolata.
Geinitz, Gaea v. Sachsen, p. 74.

Remarks.—The fossil figured under the name of *Sphenopteris Hœninghausi* by Lindley & Hutton (Fossil Flora) is a different species from that to which Brongniart applied the name. The type of *Sphenopteris Hœninghausi*, L. & H. (*non* Brongt.), is preserved in the "Hutton Collection," Newcastle-on-Tyne, and to distinguish it from Brongniart's plant, I propose for it the name of *Sphenopteris effusa*.

The plants named *Sphenopteris Hœninghausi* in my Report on the fossil plants collected in Eskdale and Liddesdale, by the Geological Survey of Scotland, must be excluded from Brongniart's species, as also the figure of *Sphenopteris Hœninghausi* given by Feistmantel (Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pl. xiv. fig. 7). Probably this latter is referrable to *Sphenopteris distans*, Sternb.

Horizon.—Coal Measures.
Locality.—Foreign. Silesia: Waldenburg.

Sphenopteris decomposita, Kidston.

Sphenopteris decomposita.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 538, pl. xxxii. figs. 1, 4, 5.

Horizon.—Cement Stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire: Glencartholm, Eskdale.

Sphenopteris stipulata, Gutbier.

Sphenopteris stipulata.
Andrae, Vorwelt. Pflanzen, p. 40, pl. xiii. fig. 4.
Boulay, Terr. Houil. du Nord de la France, p. 25.
Geinitz, Gaea v. Sachsen, p. 74.
Gutbier, Vers. d. Zwick. Schwarzk. pl. iv. fig. 10.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 464.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 79.
Zeiller, Bull. Soc. Géol. de France, 3e sér. vol. xii. p. 193.

Hymenophyllites stipulatus.
Bronn, Index Palæont. p. 1170.
Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
„ Steinkohl. u. Perm.-Ablager. p. 78.
„ Der Hangendflötzzug, p. 72.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 18, pl. xxv. figs. 3, 4, 5.

Sphenopteris rutæfolia.
Bronn, Index Palæont. p. 1170.
Geinitz, Gaea v. Sachsen, p. 75.
Giebel, Deutschl. Petrefacten, p. 43.
Gutbier, Vers. d. Zwick. Schwarzk. p. 42, pl. x. figs. 10–11.
Sternberg, Vers. ii. p. 129.
Unger, Synop. Plant. Foss. p. 66.
„ Genera et Species, p. 122.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 52.

Sphenopteris formosa.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 57, pl. xv. figs. 11–13, pl. xvi. fig. 9.

Remarks.—The plant figured as *Sphenopteris rutæfolia* by Schmalhausen must not be mistaken for Gutbier's plant of that name. Schmalhausen's *S. rutæfolia* does not appear to be Eichwald's *Gleichenites rutæfolius* with which he identifies it, but is, I think, the *Sphenopteris bifida*, L. & H. (= *Todea Lipoldi*, Stur.). (See Mém. de la Acad. Impér. des Sciences de St. Pétersbourg, viie. sér. vol. xxxi. No. 13, p. 4, pl. i. figs. 1–4 (? 5), 1883.)

Horizon.—Coal Measures.
Locality.—Foreign. Saxony: Zwickau.

Sphenopteris excelsa, Lindley & Hutton.

Sphenopteris excelsa.
Bronn, Index Palæont. p. 1168.

Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 537, pl. xxx. fig. 2, pl. xxxi. figs. 7–8.
Lindley & Hutton, Foss. Flora, vol. iii. pl. ccxii.
Sternberg, Vers. ii. p. 130.

Sphenopteris obovata.
Lindley & Hutton, Foss. Flora, vol. ii. pl. cix.

Cyclopteris obovata.
Sternberg, Vers. ii. p. 134.

Adiantites microphyllus.
Göppert, Syst. Fil. Foss. p. 228.

Remarks.—The specimen illustrated under the name of *Sphenopteris obovata*, by Lindley & Hutton (Fossil Flora, pl. cix.) is identical with their *Sphenopteris excelsa*.

I have carefully examined the type of *S. obovata*, which is preserved in the "Hutton Collection," Newcastle-on-Tyne, and have no doubt as to its specitic identity with *S. excelsa*.

"Newcastle Coalfield" is the locality given for *Sphenopteris obovata*, but from the matrix on which the plant is preserved, I believe it really comes from the Calciferous Sandstone Series of Granton, Midlothian, where *S. excelsa* occurs. Mr. Howse, the Curator of the Newcastle Museum, further informed me that from the character of the matrix he did not thing the fossil came from the Newcastle Coalfield. This view is strengthened by the fact that the specimen was communicated by T. Allan, Esq., of Edinburgh.

Horizon.—Cement Stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

Sphenopteris Haidingeri, Ettingshausen.

Sphenopteris Haidingeri.
Boulay, Terr. Houil. du Nord de la France, p. 74.
Ettingshausen, Steinkf. v. Stradonitz, p. 13, pl. ii. figs. 1–3, pl. iii. fig. 4.
Heer, Flora Foss. Helv. lief. i. p. 15, pl. i. fig. 7.
Schimper, Traité d. Paléont. Végét. vol. i. p. 382.

Horizon.—Upper Coal Measures.
Locality.—Foreign. Moravia : Rossitz.

Sphenopteris palmata, Schimper.

Sphenopteris palmata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 388, pl. xxviii. fig. 1.

? Sphenopteris elegans.
Ettingshausen, Steinkf. v. Radnitz, p. 36, pl. xv. fig. 1, and pl. xxi. fig. 1.

Remarks.—The specimen here included is similar to those described as *Sphenopteris elegans* by Ettingshausen.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia : Radnitz.

Sphenopteris Bronnii, Gutbier.

Sphenopteris Bronnii.
Boulay, Terr. Houil. du Nord de la France, p. 27 (excl. syn.).
Bronn, Index Palæont. p. 1167.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 16, pl. xxiii. figs. 15–16 (syn. *in part*).
,, Gaea v. Sachsen, p. 75.
Giebel, Deutschl. Petrefacten, p. 43.
Gutbier, Vers. d. Zwick. Schwarzk. p. 37, pl. iv. fig. 11, pl. v. figs. 1–2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 384 (syn. in part).

Sternberg, Vers. ii. p. 128.
Unger, Synop. Plant. Foss. p. 66.
„ Genera et Species, p. 121.
Zeiller, Bull. Soc. Géol. de France 3e sér. vol. xii. p. 193.

Horizon.—Coal Measures.
Locality.—*Foreign.* Saxony: Zwickau.

Sphenopteris lanceolata, Gutbier.

Sphenopteris lanceolata.
Bronn, Index Pæleont. p. 1169.
Ettingshausen, Steinkf. v. Radnitz, p. 37.
Geinitz, Vers. d. Steinkf. v. Sachsen, p. 17, pl. xxiv. fig. 4.
„ Gaea v. Sachsen, p. 76.
Giebel, Deutschl. Petrefacten, p. 40.
Gutbier, Vers. d. Zwick. Schwarzk. p. 34, pl. iv. fig. 4; pl. v. figs. 12, 18, 19.
Schimper, Traité d. Paléont. Végét. vol. i. p. 389.
Sternberg, Vers. ii. p. 127.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 62.
„ Genera et Species, p. 113.
Zeiller, Bull. Soc. Géol. de France, 3e sér. vol. xii. p. 194.

Sphenopteris acutiloba.
Andrae (*non* Stern.), Vorwelt. Pflanzen, p. 19, pl. vi. (excl. syn. and refs.).

Sphenopteris Coemansii.
Crépin, Bull. Soc. Roy. Bot. Belgique, vol. xix. pt. ii. p. 17, 1880.

Remarks.—The *Sphenopteris lanceolata*, Ett. (Foss. Flora d. Mähr. Schles. Dachschiefer. p. 19, fig. 2), is not Gutbier's plant of that name, so must be excluded here. Stur has distinguished Ettingshausen's fern as *S. Ettingshauseni* (Culm Flora, heft i. p. 29).

Horizon.—Coal Measures.
Locality.—*Foreign.* Saxony: Zwickau.

Sphenopteris Grandini, Göppert.

Sphenopteris Grandini.
Boulay, Terr. Houil. du Nord de la France, p. 27.
Schimper, Traité d. Paléont. Végét. vol. i. p. 404.

Hymenophyllites Grandini.
Bronn, Index Palæont. p. 602.
Eichwald, Lethæa Rossica, vol. i. p. 84.
Giebel, Deutschl. Petrefacten, p. 46.
Göppert, Syst. Fil. Foss. p. 255, pl. xv. fig. 12.
Unger, Synop. Plant. Foss. p. 69.
„ Genera et Species, p. 129.

Sphenopteris alata.
Brongniart, Hist. de Végét. Foss. p. 180, pl. xlviii. fig. 4.
Renault, Cours de Botan. Foss. p. 188, 1883.
Sauveur, Végét. Foss. de la Belgique, pl. xvii. fig. 2.
Sternberg, Vers. ii. p. 59.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868. p. 79.

? Hymenophyllites alatus.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 411.

Diplothmema alatum.
Stur, Culm Flora, heft 2, p. 230.
Remarks.—*Hymenophyllites* (*Sphenopteris*) *alatus*, Geinitz (Vers. d. Steinkf. in

Sachsen, p. 18, pl. xxiv. fig. 15, and pl. xxv. fig. 1) is specifically distinct from Brongniart's *Sphenopteris alata*, and has been redescribed by Weiss (Flora d. jüng. Steink. u. d. Rothl. p. 57) under the name of *Hymenophyllea subalata*. The description given by Weiss has special reference to Geinitz's fig. 15, pl. xxiv., but it is probable that his fig. 1, pl. xxv. belongs to the same plant.

Hymenophyllites alatus, Lesquereux (Report Geol. Survey of Illinois, vol. ii. p. 437, pl. xxxix. fig. 1), is perhaps also referable to *Hymenophyllea subalata*, Weiss.

Horizon.—Coal Measures.
Locality.—*British.* Shropshire : Brown Clee Hills.
Foreign. Bohemia.

Sphenopteris elegans, Brongniart.

Sphenopteris elegans.
Brongniart, Prodrome, p. 50.
„ Hist. d. Végét. Foss. p. 172, pl. liii. figs. 1, 2.
„ Class. d. Végét, Foss. p. 33, pl. ii. fig. 2.
Bronn, Index Palæont. p. 1168.
Feistmantel, Zeitsch. Deutsch. Geol. Gesell. vol. xxv. pp. 507, 594, and 597.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
„ Steinkohl. u. Perm.-Ablager. p. 73.
„ Steinkf. v. Kralup in Böhmen, pp. 11, 12.
„ Vers. d. Böhm. Kohlenab. p. 280.
? Geinitz, Flora d. Hainich.-Ebersdorfer, p. 40, pl. 2, fig. 8.
? „ Vers. Steinkf. in Sachsen, p. 16, pl. xxiv. fig. 5.
Göppert, Flora d. Silur. Devon. Unter Kohl. p. 483.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 59.
Gutbier, Vers. d. Zwick. Schwarzk. p. 32, pl. iv. fig. 2 (? fig. 1).
Lesquereux, Coal Flora of Pennsyl. p. 287, pl. lv. fig. 6.
Römer, Geol. v. Oberschlesien, p. 54.
Sauveur, Végét. Foss. de la Belgique, pl. xvi. figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 389.
Sternberg, Vers. i. fasc. 4, p. xv.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 60.
„ Genera et Species, p. 111.

Cheilanthites elegans.
Göppert, Syst. Fil. Foss. p. 233, pl. x. fig. 1 ; pl. xi. figs. 1, 2.

Diplothmema elegans.
Renault, Cours d. Botan. Foss. p. 197, pl. xxxiii. figs. 13, 14, 1883.
Stur, Culm Flora, heft 2, p. 236, pl. xiii. fig. 5 ; pl. xiv. figs. 1–6.

Sphenopteris Schlotheimii.
Sternberg, Vers. i. fasc. iv. p. xv.

Acrostichum silesiacum.
Sternberg, Vers. i. p. 29, pl. xxiii. fig. 2.

Filicites adiantoides.
Schlotheim, Flora d. Vorwelt, p. 49, pl. x. fig. 18.
„ Petrefactenkunde, p. 408, pl. xxi. fig. 2 (excl. centre fig.).

Sphenopteris officinalis.
Giebel, Deutschl. Petrefacten, p. 39.

Sphenopteris Johnstoniana.
Tate, in Johnston's Nat. Hist. of Eastern Borders, vol. i. p. 306, figs. 1, 2, 1853.

Farrnkraut.
Rhode, Beitr. z. Pflanzen d. Vorwelt, p. 33, pl. viii. figs. 7–10.

Remarks.—*Sphenopteris elegans*, Sternberg (Vers. ii. p. 56, pl. xx. figs. 3, 4), is not Brongniart's plant, but the *Sphenopteris divaricata*, Göppert, sp.

The figures of *Sphenopteris elegans* given by Geinitz are also, I think, distinct from Brongniart's species.

Horizon.—Cement Stone Group, Calciferous Sandstone Series.

Locality.—*British.* Dumfriesshire: Glencartholm, Eskdale.

Sphenopteris furcata, Brongniart.

Sphenopteris furcata.
Boulay, Terr. Houil. du Nord de la France, p. 27.
Brongniart, Prodrome, p. 50.
„ Hist. d. Végét. Foss. p. 179, pl. xlix. figs. 4–5.
Fontaine & White, Perm. or Upper Carb. Flora, p. 20.
Lesquereux, Coal Flora in Pennsyl. p. 282.
Lindley & Hutton, Foss. Flora, vol. iii. pl. clxxxi.
Sauveur, Végét. Foss. de la Belgique, pl. xviii. figs. 1–2.
Schimper, Traité d. Paléont. Végét. Foss. vol. i. p. 406.
Sternberg, Vers. ii. p. 58.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 79.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 54.

Hymenophyllites furcatus.
Bronn, Index Palæont. p. 602.
Feistmantel, Fruchtstudien Foss. Pflanzen d. Böhm. Steink. p. 40, 1872.
„ Steinkf. v. Kralup in Böhmen, pp. 11 and 21.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 597.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292 and 298.
„ Zeitsch d. Deut. Geol. Gesell. vol. xxv. p. 514, pl. xv. fig. 14?
Geinitz, Vers. d. Steinkf. in Sachsen, p. 17, pl. xxiv. figs. 8–13.
Giebel, Deutschl. Petrefacten, p. 46.
Göppert, Syst. Fil. Foss. p. 259.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 470.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 66, pl. xv. fig. 12. (The other figures are unsatisfactory.)
Unger, Synop. Plant. Foss. p. 70.
„ Genera et Species, p. 131.

Rhodea furcata.
Sternberg, Vers. ii. p. 110.

Diplothmema furcatum.
Renault, Cours d. Botan. Foss. p. 197, 1883.
Stur, Culm Flora, heft 2, p. 230.
Zeiller, Végét. Foss. du Ter. Houil. p. 45, pl. clxii. fig. 3.
„ Bull. Soc. Géol. de France 3e sér. vol. xii. p. 195.

Sphenopteris flexuosa.
Bronn, Index Palæont. p. 1168.
Giebel, Deutschl. Petrefacten, p. 40.
Gutbier, Vers. d. Zwick. Schwarzk. p. 33, pl. iv. fig. 3; pl. v. fig. 3.
Schimper, Traité d. Paléont. Végét. vol. i. p. 389.
Sternberg, Vers. ii. p. 127.
Unger, Synop. Plant. Foss. p. 62.
„ Genera et Species, p. 113.

Diplothmema flexuosum.
Stur, Culm Flora, heft 2, p. 230.

Sphenopteris geniculata.
Germar & Kaulfuss, Verh. d. k. Leop. Carl. Akad. vol. xv. p. 224, pl. lxv. fig. 2.
Sternbnrg, Vers. ii. p. 61.

Diplothmema geniculatum.
Stur, Culm Flora, heft 2, p. 230.

Trichomanites geniculatus.
Giebel, Deutschl. Petrefacten, p. 47.

Sphenopteris Kaulfussi.
Schimper, Traité d. Paléont. Végét. vol. i. p. 412.

Trichomanites Kaulfussi.
Bronn, Index Palæont. p. 1278.
Göppert, Syst. Fil. Foss. p. 264.

Sphenopteris alata.
Gutbier (*non* Brongt.), Vers. d. Zwick. Schwarzk. p. 34, pl. v. figs. 16, 17; pl. xi. fig. 1.

Sphenopteris.
Lebour, Illustrations of Fossil Plants, p. 83, pl. xli.

? Sphenopteris acutiloba.
Ettingshausen (*non* Sternb.), Steinkf. v. Radnitz, p. 35, pl. xviii. fig. 1.

? Hymenophyllites Hildreti.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 863, pl. ix. fig. 5.

? Sphenopteris Hildreti.
Lesquereux, Coal Flora in Pennsyl. p. 283.

? Sphenopteris membranacea.
Bronn, Index Palæont. p. 1169.
Crépin, Bull. Soc. Roy. Bot. Belgique, vol. xix. 2e part, p. 51.
Giebel, Deutschl. Petrefacten, p. 43.
Gutbier, Vers. d. Zwick. Schwarzk. p. 35, pl. xi. fig. 2.
Sternberg, Vers. ii. p. 127.
Unger, Synop. Plant. Foss. p. 66.
„ Genera et Species, p. 121.

? Diplothmema membranaceum.
Stur, Culm Flora, heft 2, p. 230.

Remarks.—Geinitz (Verstein. d. Steinkohlenf. in Sachsen) unites *S. membranacea*, Gutbier, with *S. furcata*, Brongt., regarding it only as a form of the latter fern. This view I feel inclined to adopt. Crépin (l. c. p. 15), however, who has been enabled to examine good specimens of *S. membranacea*, regards it as a distinct species. Should his opinion of the specific value of these two plants be adopted, fig. 9 of Geinitz's pl. xxiv., included under *S.* (*Hymenophyllites*) *furcata*, must be removed from that species and placed with *S. membranacea*, Gutbier.

From the examination of better specimens, I find that the fern I identified as *S. furcata* from the Calciferous Sandstone Series, Glencartholm, Eskdale, is *S. Machanekii*, Ett., sp.

Horizon.—Coal Measures.
Localities.—*British.* Ayrshire : Dalblare, near Old Cumnock. Lanarkshire : Airdrie. Worcestershire : Forest of Wyre.

Sphenopteris dissecta, Brongniart.

Sphenopteris dissecta.
Boulay, Terr. Houil. du Nord de la France, p. 28.

Brongniart, Prodrome, p. 50.
„ Hist. d. Végét. Foss. p. 183, pl. xlix. figs. 2, 3.
Gutbier, Vers. d. Zwick. Schwarzk. p. 75.
Römer, Palaeontographica, vol. ix. p. 24, pl. viii. fig. 3.
Sauveur, Végét. Foss. de la Belgique, pl. xvii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. i., p. 413.
Sternberg, Vers. ii. p. 59.

Hymenophyllites dissectus.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 127.
Bronn, Index Palæont. p. 602.
Geinitz, Jahrb. d. k. k. Geol. Reichsanst. p. 350, 1857 (excl. syn.).
Giebel, Deutschl. Petrefacten, p. 46.
Göppert, Syst. Fil. Foss. p. 260.
Unger, Synop. Plant. Foss. p. 71.
„ Genera et Species, p. 131.

Diplothmema dissectum.
Renault, Cours de Botan. Foss. p. 198, 1883.
Stur, Culm Flora, heft 2, p. 227.

Rhodea dissecta.
Sternberg, Vers. ii. p. 110

Horizon.—Coal Measures.
Locality.—British. Worcestershire, near Dudley.

Sphenopteris moravica, Ettingshausen, sp.

Sphenopteris moravica.
Renault, Cours de Botan. Foss. p. 193, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 414.

Trichomanes moravicum.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 100, pl. vi. fig. 4.

Rhodea moravica.
Stur, Culm Flora, heft 1, p. 38, pl. x. figs. 3–7 ; pl. xi. fig. 1.

Calymmotheca moravica.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 174.

Horizon.—Calciferous Sandstone Series.
Locality.—British. Fifeshire : Grange Quarry, Burntisland.

Sphenopteris Machanekii, Ettingshausen, sp.

Sphenopteris Machanekii.
Schimper, Traité d. Paléont. Végét. vol. i. p. 413.

Trichomanites Machanekii.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 101, fig. 12.
Römer, Geol. v. Oberschlesien, p. 55.

Hymenophyllites Machanekii.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 516, pl. xv. fig. 17.

Rhodea Machanekii.
Stur, Culm Flora, heft 1, p. 34.

Sphenopteris furcata.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 535.

Remarks.—From the examination of more perfect specimens, I find that the plant I identified as *Sphenopteris furcata* in the Report on the Fossil Plants collected in Eskdale and Liddesdale, belongs to this species.
Horizon.—Cement Stone Group, Calciferous Sandstone Series.
Locality.—British. Dumfriesshire : Glencartholm, Eskdale.

Sphenopteris, sp.

Horizon—Calciferous Sandstone Series.
Locality.—British. Midlothian : Burdiehouse, near Edinburgh.

Sphenopteris, sp.

Neuropteris heterophylla.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 288, pl. lxvi. fig. 7.

Remarks.—The specimen I place here is similar to that provisionally identified by Feistmantel as *Neuropteris heterophylla*. The fern I believe to be quité distinct from that species, and should, I am inclined to think, be placed in *Sphenopteris*.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia : Stradonitz.

PALÆOPTERIDEÆ.

PALÆOPTERIS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 475.

Palæopteris Reussii, Ettingshausen, sp.

Palæopteris Reussii.
Schimper, Traité d. Paléont. Végét. vol. i. p. 478.
Asplenites Reussii.
Andrae, Neues Jahrbuch, 1864, p. 168.
Ettingshausen, Steinkf. v. Stradonitz, p. 16, pl. i. figs. 8, 9.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia : Stradonitz.

TRIPHYLLOPTERIS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 478.

Triphyllopteris rhomboidea, Ettingshausen, sp.

Triphyllopteris rhomboidea.
Renault, Cours de Botan. Foss. p. 203, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 480.

Cyclopteris rhomboidea.
Andrae, Neues Jahrbuch, 1864, p. 173.
Ettingshausen, Steinkf. v. Stradonitz, p. 12, pl. ii. fig. 5.
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 82.
„ Der Hangendflötzzug, p. 73.

Horizon.—Coal Measures.
Locality,—Foreign. Bohemia.

NEUROPTERIDEÆ.

CARDIOPTERIS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 451.

Cardiopteris frondosa, Göppert, sp.

Cardiopteris frondosa.
Heer, Foss. Flora d. Bären Insel, p. 36 (pl. xiv. figs. 3, 4 ?).
Renault, Cours d. Botan. Foss. p. 202, pl. xxxv. fig. 1, 1883.

Schimper, Traité d. Paléont. Végét. vol. i. p. 453, pl. xxxv.
Stur, Culm Flora, heft 1, p. 43, pl. xiii. fig. 1, and pl. xiv. fig. 1.
Zeiller, Végét. Foss. du Terr. Houil. p. 48.

Cyclopteris frondosa.
Bronn, Index Palæont. p. 376.
Göppert, Neues Jahrbuch, 1847, p. 683.
" Foss. Flora d. Ubergangsgebirges, p. 163, pl. xiv. figs. 1, 2.
" Flora d. Sil. Devon. u. Unter Kohl. p. 502.
" Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 194.
Unger, Genera et Species, p. 102.

Cyclopteris Haidingeri.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 96, fig. 5, and pl. v.
Römer, Geol. v. Oberschlesien, p. 54, pl. v. fig. 1.

Cyclopteris Kœchlini.
Schimper, Terr. d. Transition d. Vosges, p. 340, pl. xxviii. figs. 1–5.

Noeggerathia obliqua.
Göppert, Gatt. d. Foss. Pflanzen, p. 108, pl. xii. fig. 2.
Stur, Verh. d. k. k. Geol. Reichsanst. 1874, p. 295.

Horizon.—Culm.
Locality.—Foreign. Vosges : Niederburbach, near Thann.

Cardiopteris polymorpha, Göppert, sp.

Cardiopteris polymorpha.
Renault, Cours d. Botan. Foss. p. 202, pl. xxxv. figs. 2, 3, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 452.
Zeiller, Végét. Foss. du Terr. Houil. p. 47.

Cyclopteris polymorpha.
Feistmantel, Zeitsch. d. Deut. Geol. Gessel. vol. xxv. p. 522, pl. xvi. figs. 21–24.
Göppert, Flora d. Sil. Devon. u. Unter. Kohl. p. 502, pl. xxxviii. fig. 5.
Schimper, Terr. d. Transition d. Vosges, p. 339, pl. xxv. figs. 1–7.

Cyclopteris polymorpha, var. *rotundifolia.*
Göppert, Flora d. Sil. Devon. u. Unter. Kohl. p. 502, pl. xxxviii. fig. 6.

Cardiopteris Hochstetteri.
Stur, Culm Flora, heft. 1, p. 48, pl. xiv. figs. 2, 3.

Cyclopteris Hochstetteri.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 97, pl. vi. fig. 3.
Römer, Geol. v. Oberschlesien, p. 54.

? *Cyclopteris Bockschiana.*
Göppert, Flora d. Sil. Devon. u. Unter. Kohl. p. 501, pl. xxxviii. fig. 3.

Remarks.—Schimper unites with this species *Cyclopteris Hochstetteri*, Ett.,* but Stur in his Culm Flora treats them as distinct. The character on which Stur seems to place considerable importance is the alternate pinnules in *C. Hochstetteri*, and the opposite pinnules in *C. polymorpha*, Göppert.

On both the figures of *C. Hochstetteri* given by Stur, the pinnules on the lower portions of the fronds are opposite, but on the upper part they are alternate.

The alternate or opposite arrangement of pinnæ or pinnules appears to be a character of little value, as they are frequently alternate and opposite on different parts of the same frond.

The variety of *C. polymorpha*, named *rotundifolia* by Göppert, probably represents the lower portion of a frond, his type of the species being the

* Schimper, l. c. p. 452.

upper part. Both these forms are shown on Stur's *C. Hochstetteri* (*loc. cit.* pl. xiv. fig. 2).

Horizon.—Culm.

Localities.—*Foreign.* Bavaria : Altendorf.
Silesia : Rothwaltersdorf, near Glatz.

NEUROPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.

Neuropteris heterophylla, Brongniart.

Neuropteris heterophylla.

Boulay, Terr. Houil. du Nord. de la France, p. 30.
Brongniart (*Filicites*), Class. d. Végét. Foss. p. 33, pl. ii. fig. 6.
„ Prodrome, p. 53.
„ Hist. d. Végét. Foss. p. 243, pls. lxxi. lxxii. fig. 2.
Bronn, Index Palæont. p. 810.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 443.
„ Foss. Plants Lower Carb. Canada, p. 38.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 303.
Fischer, Bull. Soc. Imp. Nat. Moscou, 1840, p. 492.
Fontaine and White, Perm. or Upper Carb. Flora, p. 16.
Giebel, Deutsch. Petrefacten, p. 32.
Göppert, Syst. Fil. Foss. p. 198.
Heer, Flora Foss. Helv. lief. i. p. 23, pl. iv. figs. 1, 2, 3 ; pl. v. fig. 4 (excl. xii. fig. 10*b*).
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 547.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 859.
„ Report Geol. Survey of Illinois, vol. ii. p. 430.
Lindley and Hutton, Foss. Flora, vol. iii. pl. cc.
Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 15, 1876.
Renault, Cours de Botan. Foss. p. 170, pl. xxix. figs. 6, 7, 1883.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 37, pl. xvi. figs. 5 and 7.
Römer, Palaeontographica, vol. ix. p. 28, 1862.
Sandberger, Flora d. Ober. Steinkf. im Badischen Schwarz. p. 3.
Sauveur, Végét. Foss. de la Belgique, pl. xxix. figs. 3, 4, pl. xxx. figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 439.
Sternberg, Vers. i. fasc. iv. p. 17, ii. p. 72.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 140, 142, and 143.
Unger, Synop. Plant. Foss. p. 46.
„ Genera et Species, p. 79.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 76 (excl. syn. *N. acutifolia* and *N. varians*).
Zeiller, Végét. Foss. du Terr. Houil. p. 49, pl. clxiv. figs. 1, 2.
„ Bull. Soc. Géol. France, 3^{e} sér. vol. xii. p. 196.

Neuropteris Loshii.

Andrae, Neues Jahrbuch, 1864, p. 168.
Boulay, Terr. Houil. du Nord de la France, p. 30.
Brongniart, Prodrome, p. 53.
„ Hist. d. Végét. Foss. p. 242, pl. lxxii. fig. 1, pl. lxxiii.
Bronn, Index Palæont. p. 811.
Bunbury, Quart. Journ. Geol. Soc. vol. xiv. p. 249.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
„ Geol. Survey Canada, Reports, 1874–5, p. 196.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155.

Dawson, Canadian Nat. vol. viii. p. 443.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Ettingshausen, Steinkf. v. Stradonitz, p. 11.
„ Steinkf. v. Radnitz, p. 33.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Vers. d. Böhm. Kohlenabl. p. 286, pl. lxvi. fig. 3.
„ Steinkohl. u. Perm-Ablager. p. 80.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 17 and 20.
Geinitz, Dyas. p. 138 (pl. xxviii. fig. 5 ?).
„ Neues Jahrbuch, 1867, p. 276.
Giebel, Deutschl. Petrefacten, p. 31.
Gomes, Foss. Flora do Terr. Carbon. do Porto Serra do Bussaco, p. 9.
Göppert, Syst. Fil. Foss. p. 198.
„ Foss. Flora d. Perm. Form. p. 96.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 118.
Gutbier, Vers. d. Zwick. Schwarzk. p. 55, pl. viii. fig. 6.
Heer, Flora Foss. Helv. lief. i. p. 23, pl. iii. figs. 6–8.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 858.
„ Report, Geol. Survey of Illinois, vol. ii. p. 428.
„ Coal Flora of Pennsyl. p. 98, pl. xi. figs. 1–4.
Lindley and Hutton, Foss. Flora, vol. i. pl. xlix. (fig. inaccurate).
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. p. 171, pl. xxix. fig. 1 *bis* –5.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 37, pl. xvii.
Römer, Palaeontographica, vol. ix. p. 27, 1862.
Sandberger, Flora d. Ober. Steinkf. im Badischen Schwarz. pp. 3 and 6, pl. iv. fig. 1.
Sauveur, Végét. Foss. de la Belgique, pl. xxxi. figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. i. p. 437.
Sternberg, Vers. ii. p. 72.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.
Unger, Synop. Plant. Foss. p. 46.
„ Genera et Species, p. 79.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 27.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 76.

Neuropteris Lindleyana.
Bronn, Index Palæont. p. 811.
Göppert, Syst. Fil. Foss. p. 202.
Schimper, Traité d. Paléont. Végét. vol. i, p. 437.
Sternberg, Vers. ii. p. 73.
Unger, Synop. Plant. Foss. p. 48.
„ Genera et Species, p. 83.

Neuropteris thymifolia.
Bronn, Index Palæont. p. 811.
Göppert, Syst. Fil. Foss. p. 202.
Sternberg, Vers. ii. p. 75.
Unger, Synop. Plant. Foss. p. 48.
„ Genera et Species, p. 83.

Neuropteris Soretii.
Brongniart, Prodrome, p. 53.
„ Hist. d. Végét. Foss. p. 244, pl. lxx. fig. 2.
Bronn, Index Palæont. p. 811.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155.
„ Canadian Nat. vol. viii. p. 444.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Giebel, Deutschl. Petrefacten, p. 32.

Göppert, Syst. Fil. Foss. p. 199.
Heer, Flora Foss. Helv. lief. i. p. 24, pl. vi. figs. 10, 11.
Lindley and Hutton, Foss. Flora, vol. i. pl. l.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Schimper, Traité d. Paléont. Végét. vol. i. p. 439.
Sternberg, Vers. ii. p. 73.
Unger, Synop. Plant. Foss. p. 46.
„ Genera et Species, p. 80.

Neuropteris Martini.
Bronn (*in part*), Index Palæont. p. 811.
Göppert (*in part*), Syst. Fil. Foss. p. 208.
Unger (*in part*), Synop. Plant. Foss. p. 50.
„ „ Genera et Species, p. 87.

Neuropteris Brongniarti.
Bronn, Index Palæont. p. 810.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 9.
Göppert, Syst. Fil. Foss. p. 199.
Sternberg, Vers. ii. p. 73.
Unger, Synop. Plant. Foss. p. 46.
„ Genera et Species, p. 80.

Pecopteris Dethiersii,
Brongniart, Prodrome, p. 56.

Pecopteris adiantoides.
Lindley and Hutton, Foss. Flora, vol. i. pl. xxxvii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Schimper, Traité d. Paléont. Végét. vol. i. p. 501.
Sternberg, Vers. ii. p. 159.

Alethopteris adiantoides.
Bronn, Index Palæont. p. 22.
Göppert, Syst. Fil. Foss. p. 83 (? Ref. "*P. obliqua*, L. and H." inaccurate.)
Unger, Synop. Plant. Foss. p. 83 „ „ „
„ Genera et Species, p. 151 „ „ „

Gleichenites neuropteroides.
Göppert, Syst. Fil. Foss. p. 186, pl. iv. v.

Phytolithus osmundæ regalis.
Martin, Petrificata Derbiensia, pl. xix. fig. 1.

Cyclopteris trichomanoides.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 126.
Brongniart, Hist. d. Végét. Foss. p. 217, pl. lxi. *bis*, fig. 4.
Bronn, Index Palæont. p. 377.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 23, pl. xxviii. figs. 2, 3.
Giebel, Deutschl. Petrefacten, p. 36.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 113.
Gutbier, Vers. d. Zwick. Schwarzk. p. 45, pl. vi. fig. 1.
Heer, Flora Foss. Helv. lief. i. p. 17, pl. vi. fig. 16.
Lesquereux, Coal Flora of Pennsyl. p. 79, pl. iv. fig. 4.
„ Geol. of Pennsyl. vol. ii. p. 856.
Renault, Cours d. Botan. Foss. p. 184, pl. xxx. fig. 5.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 44, pl. xvii. and pl. xix. fig. 10.
Römer, Palaeontographica, vol. ix. p. 25, 1862.
Rost, De Fil. Ectypis, p. 18.
Schimper, Traité d. Paléont. Végét. vol. i. p. 421.
Sternberg, Vers. ii. p. 67

Unger, Synop. Plant. Foss. p. 54.
„ Genera et Species, p. 96.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 78.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 23.

Adiantites trichomanoides.
Göppert, Syst. Fil. Foss. p. 220.

Cyclopteris semiflabelliformis.
Bronn, Index Palæont. p. 377.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488, pl. xxxviii. fig. 7.

Cyclopteris dilatata.
Bronn, Index Palæont. p. 376.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 10.
Lindley and Hutton, Foss. Flora, vol. ii. pl. xci. *b.*
Unger, Synop. Plant. Foss. p. 55.
„ Genera et Species, p. 99.

Neuropteris dilatata.
Lesquereux, Coal Flora of Pennsyl. p. 78.

Adiantites dilatata.
Göppert, Syst. Fil. Foss. p. 221.

Nephropteris dilatata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 430.

Cyclopteris oblata.
Bronn, Index Palæont. p. 377.
Dawson, Acadian Geol. 2nd Ed. p. 481, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 154.
„ Canadian Nat. vol. viii. p. 442.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 379.
Lindley and Hutton, Foss. Flora, vol. iii. pl. ccxvii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Sternberg, Vers. ii. p. 135.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 77.

Cyclopteris obliqua.
Brongniart, Prodrome, p. 52.
„ Hist. d. Végét. Foss. p. 221, pl. lxi. fig. 3.
Bronn, Index Palæont. p. 377.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 154.
„ Canadian Nat. vol. viii. p. 442.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Göppert, Gatt. d. Foss. Pflanzen, lief. 5, 6, p. 91, pl. iv., v. fig. 1.
Giebel, Deutsch. Petrefacten, p. 36.
Lindley and Hutton, Foss. Flora, vol. ii. pl. xc.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 45, pl. xxix. fig. 12.
Sternberg, Vers. ii. p. 68.
Unger, Synop. Plant. Foss. p. 54.
„ Genera et Species, p. 99.

Adiantites obliquus.
Göppert, Syst. Fil. Foss. p. 221.

Nephropteris obliqua.
Schimper, Traité d. Paléont. Végét. vol. i. p. 430.

Cyclopteris Germari.
Rost, De Fil. Ectypis, p. 19.
Sternberg, Vers. ii. p. 68.

Filicites conchaceus.
Germar and Kaulfuss, Verh. d. k. Leop. Carol. Akad. vol. xv. p. 227, pl. lxvi. fig. 5.

Cyclopteris crassinervis.
Göppert, Gatt. d. Foss. Pflanzen, lief. v. vi. p. 91, pl. vi. fig. 2.

Cyclopteris flabellata.
Heer, Flora Foss. Helv. lief. i. p. 18, pl. v. figs. 7, 8.

Cyclopteris inæqualis.
Gutbier, Vers. d. Zwick. Schwarzk. p. 46, pl. vi. fig. 3.

Cyclopteris orbicularis.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 289, pl. lxvii. figs. 2, 3.
Gutbier, Vers. d. Zwick. Schwarzk. p. 46, pl. vi. fig. 2.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 43, pl. xxi. fig. 3.

Phytolithus filicites.
Martin, Petrificata Derbiensia, pl. xxxiv. figs. 1, 2.
Parkinson, Organic Remains, vol. i. pl. v. fig. 5.

Remarks.—I have united *Neuropteris Loshii*, with *N. heterophylla*, Brongt., (a view adopted by several Botanists), as there is really no character by which they can be separated.

The figure of *Neuropteris Loshii*, given in Lindley and Hutton's Fossil Flora (pl. xlix.), has much perplexed Botanists, and it differs so much from *N. Loshii*, Brongt., that Sternberg distinguished it as *N. Lindleyana*. I have examined the original of Lindley and Hutton's plate, which is in the "Hutton Collection," and find it to be the ordinary form of *N. Loshii;* but their plate is inaccurately drawn, the pinnules not being separated or rounded on the specimen as shown in their figure, and the terminal lobes of the pinnæ are not *produced* as represented by them. The enlarged view is altogether misleading. Sternberg's name, *N. Lindleyana*, must therefore be reduced to a synonym of *N. heterophylla*, Brongt. Judging from the plate, it is doubtful if the *N. heterophylla*, L. and H. (Fossil Flora, pl. cxcvii.), belongs to this species. It is certainly not a characteristic example of the plant, and is, I think, to be referred to *N. gigantea*.

Pecopteris adiantoides, Lindley and Hutton, (Foss. Flora, pl. xxxvii.):—The figure of this plant is unfortunately another inaccurate drawing. In the plate the pinnæ are represented as being of almost equal width throughout their whole length, and abruptly terminated by an odd leaflet. In the specimen, which is preserved in the "Hutton Collection," the apices of all the pinnæ are broken off; hence their termination, as represented on the plate (which is about two-thirds natural size), is purely imaginary. The drawing of the pinnules is also incorrect, the plant being, in fact, merely *Neuropteris heterophylla*, Brongt.

The subject of pl. xxvii., "*Neuropteris sp.*," in Lebour's Illustrations of Fossil Plants, is also only a specimen of *N. heterophylla*, of which the figure is quite misleading.

Neuropteris Soretii, L. and H. (Fossil Flora, pl. l.):—The type of this species is also preserved in the same collection, and the plant appears to be only *N. heterophylla*. The pinnules in the figure are too much attenuated at their base. Sternberg's name for this figure, *Neuropteris thymifolia*, must therefore be suppressed.

Neuropteris Loshii, Gutbier (Vers. d. Rothl. in Sachsen, pl. iv. figs. 2, 3), is not Brongniart's plant of the same name, but in all likelihood an *Odontopteris*. (*See* Weiss. Foss. Flora d. jüng. Steink. u. d. Rothl. p. 27.)

Neuropteris heterophylla, Ettingshausen (Die Foss. Flora d. Mähr.-Schles. Dachschiefers. p. 96, fig. 4, and pl. vi. fig. 4), and *N. Loshii*, Ettingshausen (*loc. cit.* p. 95, pl. vi. fig. 2); *N. Loshii* and *N. heterophylla*, Feistmantel (Kohlenkalkvor. bei Rothwaltersdorf., Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 520, pl. xvi. fig. 20), are not referable to *N. heterophylla*, Brongt., but are the *N. antecedens*, Stur (Culm Flora, heft 1, p. 53, pl. xv. figs. 1–6).

Cyclopteris trichomanoides, Brongt., has been found attached to *Neuropteris Loshii* (*N. heterophylla*), and figured by Roehl (Vers. d. Steink. Form. Westph. pl. xvii.), and I have seen a specimen affording similar evidence as to the union of *Cyclopteris trichomanoides* with *Neuropteris heterophylla*.

In the Coalbrook Dale and Dudley Coal Fields, where *Cyclopteris trichomanoides* is very common, the pinnules vary exceedingly in form and size, and do not appear to be separable into the various species which have been created for their reception.

On specimens of *Neuropteris Scheuchzeri*, Hoff., from the Radstock Coal Field, I have seen gradations in form, from the typical acute pinnules to others truly cyclopteroid on the same pinna, and I have also observed similar differences in the shape of the pinnules situated on the main axis of this species; hence outline is of no specific value in dealing with isolated pinnules of this kind.

I believe that *Cyclopteris dilatata*, *Cyclopteris oblata*, and *Cyclopteris obliqua* are all referable to *Neuropteris heterophylla*.

Grand'Eury mentions that he finds *Cyclopteris oblata*, L. and H., to be only the pinnule of a *Neuropteris*, but he does not state to which species it was united.*

In indifferently preserved cyclopteroid pinnules the finer veins are not shown, and the stronger veins only being preserved give the pinnule a different aspect; but many specimens which at first sight appear to differ in this manner from *Cyclopteris trichomanoides* have on more careful examination been shown to belong to this species, as at certain better preserved parts of the specimen, especially near the margin, the smaller veins were shown.

To this class belongs, I believe, *Cyclopteris orbicularis*, Brongt., the chief character between which and *Cyclopteris trichomanoides* (irrespective of form, which we know varies in these pinnules, depending on their position on the fern), being its much less numerous and more distant veins.

The type of Brongniart's *Cyclopteris orbicularis* (Hist. d. Végét. Foss. pl. xli. fig. 2) is in the Oxford Museum, and Professor Moseley has kindly furnished me with the following particulars regarding it† :—

"The outline of the margin of the pinnule shown in the figure is purely imaginary, the margin not being included at all within the pebble, or if preserved anywhere, only exactly coinciding with the pebble's surface. The veins towards the margin are much more numerous than represented to be in the figure." He further states that in a given space on the margin of the figure only 13 or 14 veins are represented, whereas in a corresponding interval on the fossil he counted 49. Hence *Cyclopteris orbicularis*, Brongt. (*loc. cit.* pl. lxi. fig. 2), is evidently the same as his *Cyclopteris trichomanoides*. As to the other figure of *Cyclopteris orbicularis*, given by Brongniart, of course I cannot speak, but think it is most probably a condition of *Cyclopteris trichomanoides*, where the finer veins have disappeared.

Again, many of these pinnules occurring in ironstone nodules do not appear to be preserved in their entirety: hence we find in different examples a varying number of veins in a given marginal space, the number very much depending on whether we have the *real* margin of the pinnule before us, or an *apparent* one. As the veins repeatedly bifurcate, they become more numerous as they recede from the base of the pinnule: thus many examples which appear

* Flore Carbon. du Dép. de la Loire, p. 379.
† In letter, dated 17th August, 1883.

to have fewer veins at their margin are in reality only imperfect specimens, whose *apparent* margin may only represent a position somewhere between the base and the true margin of the pinnule. This remark is more applicable to specimens found in ironstone nodules, such as occur in South Staffordshire and at Coalbrook Dale.

Cyclopteris semiflabelliformis, Morris, is half of an ordinary pinnule of *Cyclopteris trichomanoides* which has been split in two.

Horizon.—Coal Measures.

Localities.—British. Durham : Jarrow Colliery. Lanarkshire : Chapel Hall, Airdrie; Carluke (Presented by the British Association). Lancashire : near Manchester. Northumberland : Felling Colliery, Newcastle-on-Tyne. Shropshire : Coalbrook Dale. Staffordshire : Coseley, near Dudley ; Himley, near Dudley ; Tipton, near Dudley ; Netherton, near Dudley. Worcestershire : Bewdley Forest. Yorkshire : Ironstone Pits, near Wentworth Castle.

Foreign. Bohemia. Switzerland : Col d'Anterne, Chamounix (Presented by A. Wills, Esq.).

Neuropteris rarinervis, Bunbury.

Neuropteris rarinervis.

Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 425, pl. xxii. 1847, vol. xiv. p. 248.

Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.

„ Geol. Survey, Canada, Reports, 1874–5, p. 196.

„ Quart. Journ. Geol. Soc. vol. xxii. p. 154, vol. xxx. p. 216.

„ Foss. Plants of Lower Carb. Canada, pp. 36 and 38.

„ Canadian Nat. vol. viii. p. 443.

Fontaine and White, Perm. or Upper Carb. Flora, pp. 16 and 20.

Lesquereux, Coal Flora of Pennsyl. p. 109, pl. xv. figs. 2–5.

„ Reports Geol. Survey of Illinois, vol. ii. p. 428, pl. xxxiii figs. 1–5, pl. xxxiv. fig. i. ; vol. iv. p. 386, pl. viii. figs. 1–6.

„ Geol. Survey of Pennsyl. vol. ii. p. 859.

Schimper, Traité d. Paléont. Végét. vol. i. p. 440, vol. iii. p. 475.

White, State of Indiana, 2nd Ann. Report, Dep. Statistics and Geol. 1880, p. 520, pl. x. figs. 1, 2, 3.

Zeiller, Bull. Soc. Géol. France, 3e sér. vol. xii. p. 197.

Neuropteris coriacea.

Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 387, pl. viii. figs. 7, 8.

„ Coal Flora of Pennsyl. p. 111, pl. xviii. fig. 6.

Schimper, Traité d. Paléont. Végét. vol. iii. p. 475.

Neuropteris Desorii.

Lesquereux, Geol. of Pennsyl. vol. ii. p. 859, pl. v. figs. 11, 12, and pl. xx. figs. 5–8.

„ Report, Geol. Survey of Illinois, vol. ii. p. 430.

„ Boston Journ. Nat. Hist. vol. vi. p. 418.

„ Coal Flora of Pennsyl. p. 112, pl. xiv. figs. 1–7, pl. xv. fig. 1.

Schimper, Traité d. Paléont. Végét. vol. i. p. 447.

Mixoneura Desori.

Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 865.

? Neuropteris tenuifolia.

Lebour, Illustrations of Fossil Plants, p. 25, pl. xii.

? Neuropteris orientalis.

Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 16, pl. i. fig. 1, 1876.

Remarks.—The fern identified as *N. attenuata*, by Boulay (Terr. Houil. de Nord. de la France, p. 30), is, according to Zeiller, referable to this species (Bull. Soc. Géol. France, 3e sér. vol. xii. p. 197, 1884).

Neuropteris tenuifolia, Lebour, is also probably *Neuropteris rarinervis*, but the details of the nervation are not indicated with sufficient clearness in the plate to enable one satisfactorily to settle this point. The general character of the plant, however, points to its being *N. rarinervis*, Bunbury.

Neuropteris orientalis, Ludwig, seems very closely related to *N. rarinervis*, if really distinct.

Some exquisite specimens of *Neuropteris rarinervis*, Bunbury, from Rhymney, South Wales, show that *Neuropteris coriacea*, Lesquereux, and *N. Desorii*, Lesquereux, are merely different parts of *N. rarinervis*. Schimper* has thrown out the suggestion that *N. coriacea* was, perhaps, only an inferior pinna of *N. rarinervis*, and this, from an examination of the Rhymney examples, is proved to be the case. The figures of *N. Desorii*, given by Lesquereux in the Coal Flora, do not appear to differ from *N. rarinervis* and *N. coriacea*.

In the figure of *N. Desorii* (Coal Flora, pl. xiv. fig. 2), there are some portions identical with the figures of *N. rarinervis* and *N. coriacea*, and the chief character by which *N. Desorii* is distinguished from *N. rarinervis* lies in its more "coriaceous texture, and its surface being opaque not shining," as in *N. rarinervis*. These differences are evidently due to changes which have taken place during mineralisation.

In the Rhymney specimens, the largest of which is fourteen inches long and gives off primary pinnæ about five inches apart, all the forms of pinnules, which Lesquereux has mentioned as occurring in his *N. coriacea* and *N. Desorii*, can be seen.

The specimen of *N. rarinervis* from Staffordshire, which is identical in all respects with typical plants of that species, has a much more solid texture than the Rhymney examples; but these latter have undergone immersion before fossilisation, as shown by numerous small *Spirorbis* attached to the pinnules. This immersion, though it has not destroyed the form or outline of the pinnules, has apparently produced a more delicate texture than is exhibited by specimens which have been embedded without subjection to the same conditions.

Horizon.—Coal Measures.

Localities.—*British.* Shropshire: Madeley Court (Presented by H. Pearce, Esq.). South Wales: "Big Coal Vein," Rhymney (Presented by Coles Child, Esq.).

Neuropteris gigantea, Sternberg.

Neuropteris gigantea.

Andrae, Neues Jahrbuch, 1864, p. 169.

Brongniart, Prodrome, p. 54.

„ Hist. d. Végét. Foss. p. 240, pl. lxix.

Bronn, Index Palæont. p. 810.

Bunbury (*var.*) Quart. Journ. Geol. Soc. vol. ii. p. 86, vol. iii. p. 425, vol. xiv. p. 247.

Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.

„ Quart. Journ. Geol. Soc. vol. xxii. p. 155.

„ Canadian Nat. vol. viii. p. 443.

„ Foss. Plants of Lower Carb. Canada, p. 38.

Ettingshausen, Steinkf. v. Stradonitz, p. 10.

„ Steinkf. v. Radnitz, p. 32.

Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 597.

„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 293, 298, and 303.

* Traité d. Paléont. Végét. vol. iii. p. 475.

Feistmantel, Steinkohl. u. Perm-Ablager. p. 79.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 22, pl. xxviii. fig. 1.
„ Gaea v Sachsen, p. 78.
Giebel, Deutschl. Petrefacten, p. 32.
Göppert, Syst. Fil. Foss. p. 196.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 119.
Gutbier, Vers. d. Zwick. Schwarzkohl. p. 59, pl. vi. fig. 11.
Heer, Flora Foss. Helv. lief. i. p. 22, pl. iv. figs. 4, 5, 6, pl. v. fig. 1.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 858.
Lindley and Hutton, Foss. Flora, vol. 1, pl. lii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Portlock, Geol. of Londonderry, p. 603.
Renault, Cours. d. Botan. Foss. pp. 34 and 169, pl. xxix. fig. 12, 1883.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 36, pl. xx. fig. 6.
Römer, Palaeontographica, 1862, vol. ix. p. 27.
Sauveur, Végét. Foss. de la Belgique, pl. xxxi. figs. 3, 4, pl. xxxiii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. i. p. 436.
Sternberg, Vers. i. fas. 4, p. xvi. Vers. ii. p. 72.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 45.
„ Genera et Species, p. 78.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 76.
Zeiller, Végét. Foss. du Terr. Houil. p. 50.
„ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 196.

Osmunda gigantea.
Sternberg, Vers. i. fas. 2, pp. 33 and 36, pl. xxii.

Neuropteris Martini.
Bronn (*in part*), Index Palæont. p. 811.
Göppert (*in part*), Syst. Fil. Foss. p. 208.
Unger (*in part*), Synop. Plant. Foss. p. 50.
„ (*in part*), Genera et Species, p. 87.

Neuropteris flexuosa.
Sauveur, Végét. Foss. de la Belgique, pl. xxxii. figs. 1, 2.

Filicites linguarius.
Schlotheim, Flora d. Vorwelt, p. 57, pl. ii. fig. 25.
„ Petrefactenkunde, p. 411.

Lithosmunda minor.
Luid, Lith. Brit. Ichno. p. 12, pl. iv. fig. 189, 1760.

Phytolithus osmundæ regalis.
Martin, Petrificata Derbiensia, pl. xix. fig. 2 (? fig. 1).

Neuropteris.
Bunbury, Quart. Journ. Geol. Soc. vol. xiv. p. 243, fig. *a b*.

Horizon.—Coal Measures.
Localities.—British. Northumberland : Felling Colliery, Newcastle-on-Tyne. Shropshire : Coalbrook Dale ; Madeley Court (Presented by H. Pearce, Esq.). Staffordshire : near Dudley. Worcestershire : Forest of Wyre. South Wales : "Big Coal Vein," Rhymney (Presented by Coles Child, Esq.).

Neuropteris flexuosa, Sternberg.

Neuropteris flexuosa.
Brongniart, Prodrome, p. 53.
„ Hist. d. Végét. Foss. p. 239, pl. lxviii. fig. 2, pl. lxv. figs. 2, 3.
Bronn, Index Palæont. p. 810.

Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 425, vol. xiv. p. 248.
Dawson, Foss. Plants of Lower Carb. Canada, p. 36.
„ Acadian Geol. 2nd Ed. p. 482, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155, vol. xxx. p. 216, pl. iv. fig. 12, pl. vii. figs. 7 and 10.
„ Canadian Nat. vol. viii. p. 443.
„ Geol. Survey Canada, Reports 1874–5, pp. 192 and 196.
Ettingshausen, Steinkf. v. Radnitz, p. 32.
Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 301.
„ Vers. d. Böhm. Kohlenabl. p. 286, pl. lxv. figs. 5, 6.
„ Zeitsch d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Steinkohl. u. Perm.-Ablager, p. 79.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 12, 16, 17, 20, 49.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Giebel, Deutschl. Petrefacten, p. 32.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 8.
Göppert, Syst. Fil. Foss. p. 196 (excl. ref. Trans. Geol. Soc.).
„ Foss. Flora d. Perm. Form. p. 99.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 119.
Gutbier, Vers. d. Zwick. Schwarzk. p. 56, pl. vi. fig. 12, and pl. vii. figs. 1, 2, 5, 7 (?10, 11, 12, 13).
Heer (*in part*), Flora Foss. Helv. lief. i. p. 20.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 858.
„ Report, Geol. Survey of Illinois, vol. ii. p. 428.
Ludwig, Bull. Soc. Imp. Nat. Moscou, 1876, p. 14.
Newberry, Expl. Exped. from Santa Fe, p. 18.
Renault, Cours de Botan. Foss. p. 169, pl. xxix. figs. 10, 11, 1883.
Roehl, Fos. Flora d. Steink. Form. Westph. p. 35, pl. xii. fig. 3ª, pl. xv. figs. 3 and 10 (pl. iv. fig. 1 ?).
Römer, Palaeontographica, vol. ix. p. 27, pl. viii. fig. 6, 1862.
Rost, De Fil. Ectypis. p. 23.
Schimper, Traité d. Palćont. Végét. vol. i. p. 434, pl. xxx. figs. 12, 13.
Sternberg, Vers. i. fasc. iv. p. xvi., ii. p. 71.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.
Unger, Synop. Plant. Foss. p. 45.
„ Genera et Species, p. 78.
Zeiller, Végét. Foss. du Terr. Houil. p. 51.
„ Bull. Soc. Géol. France, 3ᵉ sér. vol. xii. p. 196.

Neuropteris plicata.
Brongniart, Prodrome, p. 54.
„ Hist. d. Végét. Foss. p. 248.
Bronn, Index Palæont. p. 811.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Giebel, Deutschl. Petrefacten, p. 32.
Göppert, Syst. Fil. Foss. p. 201.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 428.
„ Geol. of Pennsyl, vol. ii. p. 857.
„ Coal Flora of Pennsyl. p. 96, pl. x. figs. 1–4.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 38 (excl. figs.).
Sternberg, Vers. i. fasc. iv. p. xvi., Vers. ii. p. 74, pl. xix. fig. 1 and 3.
Unger, Synop. Plant. Foss. p. 47.
„ Genera et Species, p. 82.

Osmunda gigantea, var. *β*.
Sternberg, Vers. i. pp. 36 and 39, pl. xxxii. fig. 2.

Remarks.—In my visits to the Radstock Coal Field, at one of the localities (Camerton) given by Brongniart for this species, I have been successful in collecting specimens of *Neuropteris flexuosa*, and had an opportunity of

examining others in the collections of the Bath Museum and J. McMurtrie, Esq., F.G.S., Radstock.

From the examination of these fossils, I am unable to find any point by which *N. flexuosa* and *N. plicata* can be separated. Some of the examples are identical with the figure of *N. plicata*, given by Lesquereux (Coal Flora of Pennsyl. pl. x. fig. 1).

Only one of Sternberg's figures of *N. plicata* shows the terminal pinnule, which is smaller than those occurring on most of the specimens of *N. flexuosa*, but this alone does not seem to me to be of specific importance.

Horizon.—Coal Measures.

Localities.—British. Durham. South Wales: "Big Coal Vein," Rhymney (Presented by Coles Child, Esq.).

Foreign. Bohemia. Savoy: Col de Balme, Alps (Presented by Sir P. G. Egerton, Trustee, Brit. Mus.). Saxony: Zwickau. Switzerland: Col d'Anterne, Chamounix (Presented by A. Wills, Esq.). United States: Murphysborough, Illinois; Wilkesbarre, Pennsylvania.

Neuropteris Leberti, Heer.

Neuropteris Leberti.

Heer, Urwelt d. Schweiz. p. 12, fig. 10.
„ Flora Foss. Helv. lief. i. p. 22, pl. ii. figs. 8–10, pl. iii. fig. 9.
Schimper, Traité d. Paléont. Végét. vol. i. p. 442.

Remarks.—This species seems closely related to *Neuropteris* (*Otopteris*) *undulata*, Sauveur (Végét. Foss. de la Belgique, pl. xxix. fig. 1).

Horizon.—Coal Measures.

Locality.—Foreign. Switzerland: Col d'Anterne, Chamounix (Presented by A. Wills, Esq.).

Neuropteris Scheuchzeri, Hoffmann.

Neuropteris Scheuchzeri.

? Brongniart, Hist. d. Végét. Foss. p. 231, pl. lxiii. fig. 5.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 7.
Gutbier, Vers. d. Zwick. Schwarzk. p. 51 (excl. figs.).
? Kimball, Flora from the Appalachian Coal Field, p. 9, pl. i. fig. 1, 1857.
Schimper, Traité d. Paléont. Végét. vol. i. p 434.
Sternberg, Vers. ii. p. 70.
Unger, Synop. Plant. Foss. p. 43.
„ Genera et Species, p. 74.
Zeiller (*in part*), Flore Houil. des Asturies, p. 6.
„ Bull. Soc. Géol. France, 3^e^ sér. vol. xii. p. 198.

? Neuropteris angustifolia.

Brongniart, Hist. d. Végét. Foss. p. 231, pl. lxiv. figs. 3, 4.
Bronn, Index Palæont. p. 810.
Ettingshausen, Steinkf. v. Radnitz, p. 32.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 287, pl. lxvi. fig. 5 (*t*).
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 301.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Geinitz, Dyas, p. 139, pl. xxvii. fig. 9.
Giebel, Deutschl. Petrefacten, p. 31.
Göppert, Syst. Fil. Foss. p. 193.
Lesquereux, Coal Flora of Pennsyl. p. 89. pl. viii. figs. 3, 6, 8, 10, 11 (excl. fig. 2.)
„ Report, Geol. Survey of Illinois, vol. iv. p. 466.

Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 13, 1876.
Roehl, Foss. Flora d. Steink. Form. Westph. pl. xiv. fig. 7.
Sternberg, Vers. ii. p. 70.
Unger, Synop. Plant. Foss. p. 43.
„ Genera et Species, p. 75.

? Neuropteris acutifolia.
Andrae, Neues Jahrbuch, 1864, p. 169.
Brongniart, Hist. d. Végét. Foss. p. 231, pl. lxiv. figs. 6, 7.
Bronn, Index Palæont. p. 810.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155.
„ Canadian Nat. vol. viii. p. 443.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Ettingshausen, Steinkf. v. Radnitz, p. 32, pl. xviii. fig. 5.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595, 597.
„ Vers. d. Böhm. Kohlenabl. p. 286, pl. lxvi. fig. 4 ?
„ Steinkohl. u. Perm.-Ablager. p. 81.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 298, and 361.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 16 and 20.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 22 (? pl. xxvii. fig. 8).
„ Neues Jahrbuch, 1867, p. 276.
Giebel, Deutschl. Petrefacten, p. 31.
Gomes, Flora Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 8.
Göppert, Syst. Fil. Foss. p. 193.
„ Die Gatt. d. Foss. Pflanzen, lief. i. u. ii. p. 5.
Gutbier, Vers. d. Zwick. Schwarzkohl. p. 52 (? pl. vii. fig. 6).
Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 12, 1876.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 34, pl. xii. fig. 4*a*, pl. xv. fig. 4.
Römer, Palaeontographica, vol. ix. p. 27 (? pl. vi. fig. 3).
Schimper, Traité d. Paléont. Végét. vol. i. p. 433 (excl. *N. cordata*, Bunbury).
Sternburg, Vers. ii. p. 70, pl. xix. fig. 4.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.
Unger, Synop. Plant Foss. p. 44.
„ Genera et Species, p. 75.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 76.

Neuropteris heterophylla.
Lindley and Hutton, Foss. Flora, vol. iii. pl. clxxxiii.

Neuropteris cordata, var. *angustifolia.*
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 424.

Neuropteris Clarksoni.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 857, pl. vi. figs. 1–4.
„ Report, Geol. Survey of Illinois, vol. ii. p. 428.
„ Coal Flora of Pennsyl. p. 94, pl. ix. figs. 1–6.
Schimper, Traité d. Paléont. Végét, vol. i. p. 446.

Neuropteris anomala.
Lesquereux, Coal Flora of Pennsyl. p. 118, pl. vii. fig. 1.

Osmunda.
Scheuchzer, Herb. Diluv. p. 48, pl. x. fig. 3.

? Phyllites mineralis.
Luid, Lith. Brit. Ichno. p. 12, pl. v. fig. 190.

Remarks.—Neuropteris heterophylla, L. and H. (Foss. Flora, pl. clxxxiii.). This figure, judging from the pinnules on the right side of the rachis, is

probably referable to *Neuropteris Scheuchzeri*, Hoffm. It is certainly not *Neuropteris heterophylla*, Brongniart.

Neuropteris Scheuchzeri, Hoffm., is extremely dimorphic in the form of its pinnules; on the same example are found some pinnules similar in form to *Neuropteris angustifolia*, Brongt., and others agreeing with *Neuropteris acutifolia* of the same author.

In the notes appended to *N. heterophylla* (*ante*, p. 89) I have already referred to a specimen on which the pinnules showed gradations in form, from lanceolate to cyclopteroid on the same pinna. On another example, also from near Radstock, the pinnules on the left side of the rachis agree with *Neuropteris Scheuchzeri*, whilst those on the right of the rachis have all the essential characters of *Neuropteris auriculata*. I am therefore inclined to conclude that *Neuropteris auriculata* will eventually require to be given up as a distinct species.

In the Radstock Coal Field *Neuropteris Scheuchzeri* occurs in an exquisite state of preservation, not only as regards the minute details of the nervation of the pinnules, but in having yielded several large specimens with the pinnules shown *in situ*, and it is from evidence afforded by these examples that I have come to the conclusion that *Neuropteris auriculata* may be only a portion of a frond of *Neuropteris Scheuchzeri*.

The plant figured as *Neuropteris angustifolia*, by Lesquereux (Coal Flora of Pennsyl. pl. viii. fig. 2), belongs, I think, to *Neuropteris cordata*, L. and H. (? Brongt.), (=*Neuropteris hirsuta*, Lesq.), and not to this species.

Two small cyclopteroid pinnules, situated at the base of the large terminal pinnule, is a character of *Neuropteris cordata*, but notwithstanding the many fine examples of *Neuropteris Scheuchzeri* which I have examined, similarly placed small cyclopteroid pinnules have not been once observed in this last-mentioned species.

From the occurrence of these small cyclopteroid pinnules on Gutbier's figure of *Neuropteris acutifolia*, which has been copied by Geinitz, I am rather inclined to think that Gutbier's plant is not referable to this species, but belongs to *Neuropteris cordata*. On this point, however, I cannot speak definitely.

Neuropteris Clarksoni, Lesq., and *Neuropteris anomala*, Lesq., appear to be indistinguishable from certain portions of the Radstock specimens of *Neuropteris Scheuchzeri*.

Neuropteris auriculata, Heer (Flora Foss. Helv. pl. iii. fig. 10, and pl. iv. figs. 18–21), is probably referable to *Neuropteris Scheuchzeri*, even if *Neuropteris auriculata* is regarded as a true species.

My friend M. Zeiller unites with *Neuropteris Scheuchzeri*, *Neuropteris cordata*, L. and H. (? Brongt.), (=*Neuropteris hirsuta*, Lesq.), *Neuropteris angustifolia*, and *Neuropteris acutifolia*, Brongt.*

Neuropteris cordata, L. and H. (? Brongt.), occurs at Radstock along with the plant I have identified as *Neuropteris Scheuchzeri*, Hoffm., with which last-mentioned species I regard, as perhaps synonymous, *Neuropteris angustifolia*, Brongt., and *Neuropteris acutifolia*, Brongt.

If the plant I have named *Neuropteris Scheuchzeri*, which appears to agree in all particulars with Scheuchzer's figure (Herb. Diluv. pl. x. fig. 3), is correctly identified, it seems impossible to unite with it *Neuropteris cordata*, L. and H. (? Brongt.), there being several well-marked characters by which they are separable.

Horizon.—Coal Measures.

Localities—British. Somersetshire: Radstock. Worcestershire: Bewdley.
Foreign. Saxony: Zwickau.

* Flore Houil. des. Asturies, pp. 6–10.

Neuropteris cordata, Lindley and Hutton, (? Brongniart).

Neuropteris cordata.
Boulay, Terr. Houil. du Nord. de la France, p. 29.
Brongniart, Hist. d. Végét. Foss. p. 229, pl. xliv. fig. 5.
Bronn, Index Palæont. p. 810.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86, vol. iii. p. 423, pl. xxi. fig. 1 *a–f*, 1847.
Dawson, Acadian Geol. 2nd Ed. p. 482, fig. 166*b*, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 154; vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 443.
„ Geol. Survey, Canada, Reports 1874–5, p. 192.
„ Foss. Plants of Lower Carb. Canada, p. 38.
Fontaine and White, Perm. or Upper Carb. Flora, p. 52.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Giebel, Deutschl. Petrefacten, p. 31.
Gomes, Flore Foss. do Terr. Carbon. do Porto Serra do Bussaco, p. 7.
Göppert, Foss. Flora d. Perm. Form. p. 100, pl. xi. figs. 1, 2.
„ Syst. Fil. Foss. p. 192.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 119.
Heer, Flora Foss. Helv. lief. i. p. 19.
Lesquereux, Coal Flora of Pennsyl. p. 91.
Lindley and Hutton, Foss. Flora, vol. i. pl. xli.
Renault, Cours d. Botan. Foss. p. 173, 1883.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 33, pl. xiii. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. i. p. 432.
Sternberg, Vers. ii. p. 70.
Stur, Verh. d. k. k. Geol. Reichsanst. 1874, pp. 303, 304; 1884, p. 141.
Unger, Neues Jarhbuch, 1842, p. 608.
„ Synop. Plant. Foss. p. 43.
„ Genera et Species, p. 74.

Neuropteris hirsuta.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 16, 17, 20 and 47, pl. viii. figs. 7, 8.
Lesquereux, Boston Journ. Nat. Hist. vol. vi. p. 417, 1857.
„ Geol. of Pennsyl. vol. ii. p. 857, pl. iii. fig. 6; pl. iv. figs. 1–16 (syn. in part).
„ Report, Geol. Survey of Illinois, vol. ii. p. 427, pl. xxxv. figs. 6–10; vol. iv. p. 380.
„ Coal Flora of Pennsyl. p. 88, pl. viii. figs. 1, 4, 5, 7, 9, 12.
Newberry, Explor. Exped. from Santa Fe, p. 18.
Schimper, Traité d. Paléont. Végét. vol. i. p. 445.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 869, 1870.
White, State of Indiana: 2nd Ann. Rept. Dept. of Statistics and Geol. 1880, p. 520, pl. ix. figs. 1–3.

Neuropteris dictyopteroides.
Fontaine and White, Perm. or Upper Carb. Flora, p. 49, pl. viii. figs. 3–5.

Neuropteris squarrosa.
Ettingshausen, Steinkf. v. Stradonitz, p. 10, pl. vi. fig. 3.

Neuropteris.
Hitchcock, Final Rept. Geol. of Massachusetts, vol. ii. p. 542, pl. xxi. fig. 1 (upper part).

Dictyopteris neuropteroides.
Andrae, Neues Jahrbuch, 1864, p. 170.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Steink. u. Perm.-Ablager, p. 81.

Heer, Flora Foss. Helv. lief. i. p. 37 (? pl. vii. fig. 9).
Geinitz, Vers. d. Steinkf. in Sachsen, p. 23, pl. xxviii. fig. 6.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 120.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 49, pl. xiv. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. i. p. 618.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.

Dictyopteris cordata.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 50. pl. xv. fig. 6; pl. xxi. fig. 7*b*.
Römer, Palaeontographica, vol. ix. p. 30, pl. vi. fig. 4, 1862.
Schimper, Traité d. Paléont. Végét. vol. i. p. 619; vol. iii. p. 515.

Dictyopteris Scheuchzeri.
Römer, Palaeontographica, vol. ix. p. 30, pl. ix. fig. 1, 1862.
Schimper, Traité d. Paléont. Végét. vol. i. p. 619; vol. iii. p. 515.

Neuropteris angustifolia.
Lesquereux (? *in part*), Coal Flora of Pennsyl. pl. viii. fig. 2.

Remarks.—The surface of the pinnules in *Neuropteris cordata* often bears very many short stiff hairs, though in some cases only a few are present. When these hairs are numerous and pressed down on the surface of the pinnule obliquely to the nerves, they give the fern a dictyopteroid appearance, which has caused this species to be described as a *Dictyopteris* by several authors. In well preserved examples, these little bristles can easily be distinguished from the veins. *Neuropteris cordata* is not uncommon at Radstock, Rhymney, and Leebotwood. The specimens from which Lindley and Hutton's figures of *Neuropteris cordata* were taken seem to be lost, but in the Museum of the Geological Society of London are examples from the same locality (Leebotwood) as that from which Lindley and Hutton's plants were collected. These agree with the plate in the Fossil Flora with this addition, that they clearly show the hirsute character of the species, which seemingly has escaped the notice of the writers of the Fossil Flora. That *Neuropteris hirsuta*, Lesquereux, is the same plant as *Neuropteris cordata*, L. and H. (? Brongt.), is an irresistible conclusion.

Bunbury in 1847 pointed out the hirsute nature of *Neuropteris cordata*,* and also figured a specimen showing the small cyclopteroid pinnules *in situ*. It is therefore curious, as Bunbury's figures are identical with those given by Lesquereux as *Neuropteris hirsuta*, that this author should give Bunbury's figure as a reference to *Neuropteris angustifolia*, which he treats as specifically distinct from his *Neuropteris hirsuta*.

Although I have placed *Neuropteris angustifolia* and *Neuropteris acutifolia* under *Neuropteris Scheuchzeri*, I do so with considerable hesitation, as it is possible that these two species may eventually require to be placed here; for Zeiller, who has examined Brongniart's types of these two ferns, states that they show clearly small hairs on their surface. This being so, possibly *Neuropteris angustifolia* and *Neuropteris acutifolia* may belong to *Neuropteris cordata*, but the last-named species cannot be united with *Neuropteris Scheuchzeri*, Hoffm., as has been done by Zeiller.

Neuropteris decipiens, Lesquereux (Coal Flora of Pennsyl. p. 93), is very doubtfully distinct from *Neuropteris cordata*.

Of the figures of *Neuropteris angustifolia* given by Lesquereux, that in the Coal Flora (pl. viii. fig. 2) is evidently referable to *Neuropteris cordata*. Probably his other figures of *Neuropteris angustifolia* may also belong to the same species. Further notes regarding *Neuropteris cordata* will be found in the remarks appended to *Neuropteris Scheuchzeri*.

Horizon.—Coal Measures.

* Quart. Journ. Geol. Soc. vol. iii. p. 453

Localities.—British. Shropshire: Madeley Court (Presented by H. Pearce, Esq.). Somersetshire: Camerton. Staffordshire: Sandwell Park, Trial Boring, West Bromwich. Wales: "Big Coal Vein," Rhymney (Presented by Coles Child, Esq.). Worcestershire: Bewdley.

Foreign. Bohemia.
United States: Mazon Creek, Grundy Co., Illinois.

Neuropteris Villiersii, Brongniart.

Neuropteris Villiersii.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 125.
Brongniart, Hist. d. Végét. Foss. p. 233, pl. lxiv. fig. 1.
„ Prodrome, p. 53.
? Fischer, Bull. Soc. Imp. Nat. Moscou, 1840, p. 238.
Geinitz, Gaea v. Sachsen, p. 77.
Giebel, Deutschl. Petrefacten, p. 33.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 858.
„ Report, Geol. Survey of Illinois, vol. ii. p. 428.
Rost, De Fil. Ectypis, p. 22.

Cyclopteris Villiersii.
Bronn, Index Palæont. p. 377.
Sternberg, Vers. ii. p. 66.
Unger, Synop. Plant. Foss. p. 56.
„ Genera et Species, p. 99.

Adiantites Villiersii.
Göppert, Syst. Fil. Foss. p. 225.

Callipteris Villiersii.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 874.

Neuropteris auriculata.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 125.
Brongniart, Hist. d. Végét. Foss. p. 236, pl. lxvi.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
„ Geol. Survey, Canada, Reports, pp. 192 and 196, 1874–5.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155; vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 444.
„ Foss. Plants Lower Carb. Canada, p. 38.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Vers. d. Böhm. Kohlenab. p. 287, pl. lxvii. fig. 1.
Fontaine and White, Perm. or Upper Carb. Flora, p. 50.
Geinitz, Neues Jahrbuch, 1867, p. 276.
„ Gaea v. Sachsen, p. 77.
„ Vers. d. Steinkf. in Sachsen, p. 21, pl. xxvii. figs. 4–7.
Germar, Vers. d. Wettin u. Löbejun, p. 9, fasc. i. pl. iv.
Giebel, Deutschl. Petrefacten, p. 33.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 10.
Göppert (*in part*), Foss. Flora d. Perm. Form. p. 98.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 119.
Ludwig, Bull. Soc. Imp. Nat. Moscou, 1876, p. 14.
Renault, Cours d. Botan. Foss. p. 173, pl. xxix. fig. 13, 1883.
Rost, De Fil. Ectypis, p. 22.
Schimper, Traité d. Paléont. Végét. vol. i. p. 443.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 76.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 26.
Zeiller, Végét. Foss. du Terr. Houil. p. 52.

Cylopteris auriculata.
Bronn, Index Palæont. p. 376.
Ettingshausen, Steinkf. v. Radnitz, p. 34.
Gutbier, Vers. d. Zwick. Schwarzk. p. 49, pl. vi. figs. 8 and 13.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 45, pl. xiv. fig. 12.
Römer, Palaeontographica, vol. ix. p. 26, 1862.
Sternberg, Vers. ii. p. 66, pl. xxii. fig. 6.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 142.
Unger, Synop. Plant. Foss. p. 55.
„ Genera et Species, p. 99.

Adiantites auriculatus.
Göppert, Syst. Fil. Foss. p. 224.

Neuropteris obtusifolia.
Rost, De Fil. Ectypis, p. 23.

Neuropteris ingens.
? Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 425, 1847.
Dawson, Acadian Geol. 2nd Ed. p. 481, 1868.
„ Canadian Nat. vol. viii. p. 442.
„ Foss. Plants Lower Carb. Canada, p. 36.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 154.
Lindley and Hutton, Foss. Flora, vol. ii. pl. xci *a*.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Sternberg, Vers. ii. p. 137.
Unger, Synop. Plant. Foss. p. 50.
„ Genera et Species, p. 87.

Filicites osmundæ.
Artis, Antedil. Phytol. pl. vii.

Remarks.—See notes appended to *Neuropteris Scheuchzeri.*
Horizon.—Coal Measures.
Localities.—British. Shropshire : Coalbrook Dale. Worcestershire, near Dudley.

(?) **Neuropteris verbenæfolia,** Lesquereux.

Neuropteris verbenæfolia.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 431, pl. xxxvii. fig. 1 ; vol. iv. p. 385, pl. vi. figs. 5, 6.
„ Coal Flora of Pennsyl. p. 120, pl. xviii. figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 476.

Remarks.—The specimen shows a pinnule about 2½ inches long, attached to a rachis ⅓ inch broad. It is not well preserved, but one of the margins of the pinnule is serrated as described by Lesquereux. The imperfect preservation of the fossil prohibits a satisfactory determination of the species.
Horizon.—Coal Measures.
Locality.—Foreign. United States : Mount Carbon, Pennsylvania.

Neuropteris Elrodi, Lesquereux.

Neuropteris Elrodi.
Lesquereux, Coal Flora of Pennsyl. p. 107, pl. xiii. fig. 4.

Remarks.—The specimens I have referred to this species are not very large, but appear to agree with Lesquereux's figure and description.
Horizon.—Coal Measures.
Locality.—British. Staffordshire, near Dudley.

(?) **Neuropteris attenuata**, Lindley and Hutton.

Neuropteris attenuata.
Bronn, Index Palæont. p. 810.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
" Quart. Journ. Geol. Soc. vol. xxii. p. 155.
" Canadian Nat. vol. viii. p. 443.
" Foss. Plants Lower Carb. Canada, p. 36.
Lindley and Hutton, Foss. Flora, vol. iii. pl. clxxiv.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 472.

Sphenopteris attenuata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 377.

Remarks.—The specimen I place here does not well show the details of the nervation or the mode of attachment of the pinnules to the rachis, but in general outline it agrees pretty well with Lindley and Hutton's figure. Some time ago, when I saw the type of this species, I felt more inclined to regard it as a *Pecopteris* allied to *Pecopteris Bucklandi* than as a *Neuropteris*.
Horizon.—Coal Measures.
Locality.—(?) *British.* Somersetshire : Radstock Coal Field.

Neuropteris lacerata, Heer, sp.

Cyclopteris lacerata.
Heer, Flora Foss. Helv. lief. i. p. 17, pl. vi. fig. 17.
Renault, Cours d. Botan. Foss. p. 185, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 421.

Remarks.—*Neuropteris fimbriata*, Lesquereux (Coal Flora of Pennsyl. p. 81, pl. v. figs. 1–6), appears to be very closely related to this species. The only stated difference between the two fossils lies in the veins of *N. fimbriata*, Lesq., not being so "dense" as those of *N. lacerata*, Heer, sp. This difference may have been produced during fossilisation, or may be due to peculiarities of the matrix in which the specimens are preserved.
Cyclopteris ciliata, Heer (Flora Foss. Helv. p. 17, pl. vi. fig. 24), is closely related to his *Cyclopteris lacerata.*
Horizon.—Coal Measures.
Locality.—Foreign. Switzerland : Col d'Anterne, Chamounix. (Presented by Alfred Wills, Esq.)

(?) **Neuropteris Germari,** Göppert, sp.

Neuropteris Germari.
Lesquereux, Coal Flora of Pennsyl. p. 113, pl. xviii. figs. 3–5.

Cyclopteris Germari.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 856, pl. v. fig. 5.
Rost (*in part*), De Fil. Ectypis, p. 19.
Unger, Synop. Plant. Foss. p. 54.
" Genera et Species, p. 96.

Adiantites Germari.
Göppert, Syst. Fil. Foss. p. 218.
Schimper, Traité d. Paléont. Végét. vol. i. p. 426.

Filicites crispus.
Germar and Kaulfuss, Verh. d. k. Leop. Carol. Akad. vol. xv. part ii. p. 229, pl. lxvi. fig. 6.

Schizopteris flabellata.
Sternberg, Vers. ii. p. 112 (? excl. syn. Gutbier).
Unger, Genera et Species, p. 105 (? excl. syn. Gutbier).

Remarks.—Among the specimens from the Forest of Wyre is one which agrees with the description of *Filicites crispus*, Germar and Kaulfuss. Les-

quereux describes some very similar plants under the name of *Neuropteris Germari*.

Geinitz (Vers. d. Steinkf. in Sachsen, p 20, pl. xxvi. figs. 3–5) figures certain fossils very similar to the plant described by Germar and Kaulfuss, which he believed to be identical with it. These he unites with *Odontopteris Reichiana*, and in this view he is followed by Weiss (Foss. Flora d. jüng. Steink. u. d. Rothl. p. 32). The nervation in Geinitz's figures appears finer than in the figure given by Germar and Kaulfuss, with which latter the specimen from the Forest of Wyre agrees.

Although I have provisionally treated this fossil as a separate species, it is quite possible, notwithstanding the apparent difference in the coarser nervation of Germar and Kaulfuss's *Filicites crispus* from the figures of *Odontopteris Reichiana* given by Geinitz, that it may belong to that species. *Odontopteris Reichiana* also occurs at the Forest of Wyre.

It is a little doubtful if, as supposed by some authors, Gutbier's *Fucoides dentatus* (Vers. d. Zwick. Schwarzk. pl. 1, figs. 1, 2, and 4) is to be referred to this species.

Horizon.—Coal Measures.

Locality.—British. Worcestershire : Forest of Wyre.

DICTYOPTERIS, Gutbier, 1835.

Abdrücke und Versteinerungen des Zwickauer Schwarzkohlengebirges. p. 62.

Dictyopteris Brongniarti, Gutbier.

Dictyopteris Brongniarti.

Bronn, Index Palæont. p. 423.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595, 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 301.
„ Steink. u. Perm.-Ablager. p. 81.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 23, pl. xxviii. figs. 4, 5.
„ Gaea v. Sachsen, p. 79.
Giebel, Deutschl. Petrefacten, p. 39
Göppert, Gatt. d. Foss. Pflanzen, lief. v.–vi. p. 87, pl. iii.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 120.
Gutbier, Vers. d. Zwick. Schwarzk. p. 63, pl. xi. figs. 7, 9, 10.
Renault, Cours d. Botan. Foss. p. 176, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. 617.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.
Unger, Synop. Plant. Foss. p. 58.
„ Genera et Species, p. 106.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.
Zeiller, Végét. Foss. du Terr. Houil. p. 53.

Dictyopteris obliqua.

Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 427, pl. xxi. fig. 2.
Dawson, Acadian Geol. 2nd Ed. p. 483, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 156.
„ Canadian Nat. vol. viii. p. 444.
„ Foss. Plants Lower Carb. Canada, p. 36.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Lesquereux, Coal Flora of Pennsyl. p. 146, pl. xxiii. figs. 4–6.
„ Geol. of Pennsyl. vol. ii. p. 861.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 51, pl. iii. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. i. p. 618.

Linopteris Gutbieriana.

Sternberg, Vers. ii. p. 167.

Remarks.—Dictyopteris Brongniarti, Boulay (Terr. Houil. du Nord de la France, p. 35), is, according to Zeiller, *Dictyopteris subbrongniarti*, a closely allied species.

Dictyopteris obliqua, Bunbury, is united here with *D. Brongniarti*, as I have failed to discover in his description or figures any character by which these two species can be separated. It is stated by Bunbury of his *Dictyopteris obliqua*, "Possibly it may be identical with *D. Brongniarti*, Gutbier, but as I have neither seen description or figure of that plant, I am obliged to describe the one before us as new."

Horizon.—Coal Measures.

Locality.—British. Gloucestershire: Forest of Dean.

Foreign. Saxony: Zwickau. Silesia: Waldenburg.

ODONTOPTERIDEÆ.

ODONTOPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 34.

Odontopteris Reichiana, Gutbier.

Odontopteris Reichiana.

Bronn, Index Palæont. p. 838.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 20, pl. xxvi. figs. 3–7.
„ Gaea v. Sachsen, p. 79.
Giebel, Deutschl. Petrefacten, p. 35.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 112.
Gutbier, Vers. d. Zwick. Schwarzk. p. 65, pl. ix. figs. 1, 2, 3, 5, 7, pl. x. fig. 13.
Renault, Cours d. Botan. Foss. p. 180, 1883.
Sandberger, Flora d. Ober. Steinkf. im Badischen Schwarz. p. 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 456.
Sternberg, Vers. ii. p. 137.
Unger, Synop. Plant. Foss. p. 52.
„ Genera et Species, p. 92.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868. p. 77.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 32, pl. i. figs. 3–9.
Zeiller, Végét. Foss. d. Terr. Houil. de la France, p. 61, pl. clxvi. figs. 1, 2.

Xenopteris Reichiana.

Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 865.

Odontopteris Böhmii.

Bronn, Index Palæont. p. 837.
Feistmantel, Vers. d. Böhm. Kohlenabl. p. 290, pl. lxvii. figs. 4, 5.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 301.
Geinitz, Gaea v. Sachsen, p. 79.
Giebel, Deutschl. Petrefacten, p. 35.
Gutbier, Vers. d. Zwick. Schwarzk. p. 67, pl. x. fig. 12.
Sternberg, Vers. ii. p. 138.
Unger, Synop. Plant. Foss. p. 52.
„ Genera et Species, p. 93.

Odontopteris dentata.

Bronn, Index Palæont. p. 838.
Geinitz, Gaea v. Sachsen, p. 79.
Giebel, Deutschl. Petrefacten, p. 35.
Gutbier, Vers. d. Zwick. Schwarzk. p. 68, pl. ix. fig. 4.

Sternberg, Vers. ii. p. 138.
Unger, Synop. Plant. Foss. p. 52.
„ Genera et Species, p. 93.

Remarks.—*Odontopteris Reichiana*, Roehl (Foss. Flora d. Steink. Form. Westphalens, pl. iv. fig. 2), does not belong to this species.

Some of the figures given by Fontaine and White of their *Odontopteris nervosa*, *Odontopteris densifolia*, and *Odontopteris pachyderma* (Perm. or Upper Carb. Flora, pl. x.), approach very closely to Gutbier's *Odontopteris Reichiana*, and are very doubtfully distinct from it.

Horizon.—Coal Measures.

Localities.—*British.* Worcestershire : Forest of Wyre.
Foreign. Bohemia : Stradonitz. Saxony : Zwickau.

Odontopteris minor, Brongniart.

Odontopteris minor.
Brongniart, Prodrome, p. 60.
„ Hist. d. Végét. Foss. p. 253, pl. lxxvii.
Bronn, Index Palæont. p. 838.
Giebel, Deutschl. Petrefacten, p. 35.
Göppert, Syst. Fil. Foss. p. 213.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 112.
Renault, Cours de Botan. Foss. p. 181, pl. xxx. fig. 11, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 445.
Sternberg, Vers. ii. p. 79.
Unger, Synop. Plant. Foss. p. 51.
„ Genera et Species, p. 89.
Zeiller, Végét. Foss. du Terr. Houil. p. 62.

Xenopteris minor.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 865.

Horizon.—Coal Measures.

Localities.—*Foreign.* France : La Croizet, near St. Etienne. (Presented by M. C. Chantre). Moravia : Rossitz.

Odontopteris osmundæformis, Schlotheim, sp.

Odontopteris osmundæformis.
Renault, Cours d. Botan. Foss. p. 182, pl. xxx. fig. 9, 1883.
Zeiller, Végét. Foss. du Terr. Houil. p. 63.

Odontopteris Schlotheimii.
Brongniart, Prodrome, p. 60.
„ Hist. d. Végét. Foss. p. 256, pl. lxxviii. fig. 5.
Bronn, Index Palæont. p. 838.
„ Lethæa Geog. vol. i. part ii. p. 3, pl. vii. fig. 1.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 426, 1847.
Dawson, Acadian Geol. 2nd Ed. p. 482, 1868.
„ Geol. Survey, Canada, Reports, p. 196, 1874–5.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 155 ; vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 444.
„ Foss. Plants Lower Carb. Canada, p. 38.
Feistmantel, O., Steink. u. Perm.-Ablager, p. 81.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
„ K., Der Hangendflötzzug, p. 73.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Giebel, Deutschl. Petrefacten, p. 34.
Göppert, Gatt. d. Foss. Pflanzen, heft v. vi. p. 98, pl. vi. figs. 1–5.
„ Foss. Flora d. Perm. Form. p. 109, pl. xiv. figs. 2, 3.
„ Syst. Fil. Foss, p. 213.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 117.

Guembel, Denk. d. k. Bayer. Botan. Gesell. vol. iv. p. 102, pl. viii. fig. 2. 1859.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 860.
„ Report, Geol. Survey of Illinois, vol. iv. p. 391.
„ Coal Flora of Pennsyl. p. 136. pl. xx. figs. 1, 2.
Schimper (*in part*), Traité d. Paléont. Végét. vol. i. p. 460; vol. iii. p. 477 (excl. syn. *O. Britannica.*)
Sternberg, Vers. ii. p. 79.
Unger, Synop. Plant. Foss. p. 51.
„ Genera et Species, p. 90.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 77.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 34, pl. i. figs. 11–13.

Xenopteris Schlotheimii.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 865, pl. xxi. fig. 5.

Filicites osmundæformis.
Schlotheim, Flora d. Vorwelt, p. 33, pl. iii. figs. 5, 6.
„ Petrefactenkunde, p. 412.

Filicites vesicularis.
Göppert, Syst. Fil. Foss. pp. xiii., xiv.
Schlotheim, Flora d. Vorwelt, p. 59, pl. xiii. fig. 26.
„ Petrefactenkunde, p. 413.

Weissites vesicularis.
Geinitz, Vers. d. Zechst. u. Rothl. p. 21, pl. viii. fig. 8 (?).
Giebel, Deutschl. Petrefacten, p. 63.
Göppert, Syst. Fil. Foss. p. xiv.
Sternberg, Vers. ii. p. 174.
Unger, Synop. Plant. Foss. p. 106.
„ Genera et Species, p. 191.

Neuropteris nummularia.
Sternberg, Vers. i. fasc. 4, p. xvii.

Odontopteris obtusiloba.
? Göppert, Foss. Flora d. Perm. Form. pl. xiv. figs. 6, 7.

Odontopteris crassinervis.
Göppert, Foss. Flora d. Perm. Form, p. 113, pl. xiv. figs. 11, 12.

Horizon.—Coal Measures.
Locality.—Foreign. Portugal.

Odontopteris obtusa, Brongniart.

Odontopteris obtusa.
Brongniart, Prodrome, p. 60.
„ Hist. d. Végét. Foss. p. 255, pl. lxxviii. figs. 3, 4.
Bronn, Index Palæont. p. 838.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 12.
Göppert, Syst. Fil Foss. p. 214.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. p. 182, pl. xxx. fig. 10, 1883.
Unger, Synop. Plant. Foss. p. 51.
„ Genera et Species, p. 90.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 77.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 36, pl. ii., iii., and vi. fig. 12.

Mixoneura obtusa.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 865.

Zamites obtusus.
Sternberg, Vers. ii. p. 199.

Odontopteris obtusiloba.
Feistmantel, O., Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 595.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
„ K., Hangendflötzzug, p. 74.
Geinitz, Dyas, p. 137, pl. xxviii. figs. 1–4; xxix. figs. 1–4, 8–10.
Giebel, Deutschl. Petrefacten, p. 35.
Göppert, Foss. Flora d. Perm. Form. p. 108, pl. xiv. figs. 4, 5 (excl. figs. 6, 7).
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 116.
Gümbel, Denk. d. k. Bayer. Botan. Gesell. vol. iv. p. 101, pl. viii. fig. 1.
Gutbier, Vers. d. Rothl. in Sachsen, p. 14, pl. viii. figs. 9–11.
Renault, Cours d. Botan. Foss. p. 181, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 458 (excl. syn. Gümbel, (*O. Schlotheimii*).
Zeiller, Végét. Foss. du Terr. Houil. p. 63.
„ Bull. Soc. Géol. France, 3e sér. vol. viii. p. 198.

Odontopteris linguata.
Renault, Cours d. Botan. Foss. p. 182, 1883.
Schimper, Traité d. Paléont. Végét. vol. i. p. 459.

Neuropteris linguata.
Göppert, Gatt. d. Foss. Pflanzen, lief v. vi. p. 104, pl. viii. and ix. figs. 12, 13.
„ Foss. Flora d. Perm. Form. p. 98.
Unger, Genera et Species, p. 81.

Neuropteris subcrenulata.
Andrae, Jahrb. d. Naturwiss. Vereines. Halle, 1850, p. 125.
Germar, Vers. v. Wettin u. Löbejun. p. 11, pl. v.
Giebel, Deutschl. Petrefacten, p. 31.
Göppert, Gatt. d. Foss. Pflanzen, lief. v. vi. p. 106, pl. viii. and ix. fig. 6.
Rost, De Fil. Ectypis. p. 22.

Cyclopteris subcrenulata.
Unger, Synop. Plant. Foss. p. 56.
„ Genera et Species, p. 99.

Odontopteris Sternbergi.
Göppert, Gatt. d. Foss. Pflanzen, lief. v. vi. p. 99, pl. vii. fig. 1.
„ Foss. Flora d. Perm. Form. p. 109.
Schimper, Traité d. Paléont. Végét. vol. i. p. 458.

Odontopteris Stiehleriana.
Göppert, Foss. Flora des Ubergangs. p. 157, pl. xiii. figs. 1, 2.
„ Foss. Flora d. Perm. Form. p. 108, pl. xiv. figs. 8–10.
Schimper, Traité d. Paléont. Végét. vol. i. p. 461.

Odontopteris appendiculata.
Sauveur, Végét. Foss. de la Belgique, pl. xxxv. fig. 4.

Tæniopteris Brardii.
Sternberg, Vers. ii. p. 141.

Cyclopteris exsculpta.
Göppert, Foss. Flora d. Perm. Form. p. 116, pl. xiii. fig. 5.

Neuropteris postcarbonica.
Gümbel, Denk. d. k. Bayer. Botan. Gesell. vol. iv. p. 102, pl. viii. fig. 3.

? Cyclopteris auriculata.
Gümbel, Denk. d. k. Bayer. Botan. Gesell. vol. iv. p. 103, pl. viii. fig. 4.

? Cyclopteris elongata.
Gümbel, Denk. d. k. Bayer. Botan. Gesell. vol. iv. p. 103, pl. viii. fig. 6.

? Cyclopteris neuropteroides.
Gümbel, Denk. d. k. Bayer. Botan. Gesell. vol. iv. p. 103, pl. viii. fig. 5.

Remarks.—Odontopteris obtusa, Lindley and Hutton (Foss. Flora, vol. i. pl. xl.), is not Brongniart's plant of the same name, and has been distinguished from it by Sternberg as *Odontopteris Lindleyana* (Vers. ii. p. 78).
Odontopteris obtusiloba, Roehl (Foss. Flora d. Steink. Form. Westph. pl. xvi. figs. 12–15), must also be excluded here, as his figures do not belong to this species, with the exception of the enlargement, fig. 13, which appears to be copied from Geinitz.*
Horizon.—Coal Measures.
Locality.—Foreign. Rhenish Prussia : Saarbrück.

Odontopteris Britannica, Gutbier.

Odontopteris Britannica.
Boulay, Terr. Houil. du Nord de la France, p. 30.
Bronn, Index Palæont, p. 836.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 21, pl. xxvi. figs. 8–11.
„ Gaea v. Sachsen, p. 79.
Giebel, Deutschl. Petrefacten, p. 35.
Gutbier, Vers. d. Zwick. Schwarzk. p. 68, pl. ix. figs. 8–11.
Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 17 (? pl. i. fig. 3), 1876.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 41 (? pl. xx. figs. 4 and 12).
Sandberger, Flora d. Ober. Steinkf. im Badischen Schwarz. p. 2.
Sternberg, Vers. ii. p. 138.
Unger, Synop. Plant. Foss. p. 52.
„ Genera et Species, p. 93.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 45, pl. i. fig. 2.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 77.

Callipteris Britannica.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 875.

Weissites gemmæformis.
Geinitz, Gaea v. Sachsen, p. 85.

Odontopteris connata.
Römer, Palaeontographica, vol. ix. p. 31, pl. viii. fig. 7, 1862.

Odontopteris Schlotheimii.
Schimper (*in part*), Traité d. Paléont. Végét. vol. i. p. 460.

Horizon.—Coal Measures.
Localities.—British. Worcestershire : Forest of Wyre. Worcestershire : Tipton, near Dudley.

* Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 43.

PECOPTERIDEÆ.

MARIOPTERIS, Zeiller, 1879.

Bull. Soc. Géol. France, 3e sér. vol. vii. p. 92.

Mariopteris muricata, Schlotheim, sp.

Mariopteris muricata.
Zeiller, Végét. Foss. du Terr. Houil. p. 71, pl. clxvii. fig. 5.
„ Bull. Soc. Géol. France, 3e sér. vol. vii. p. 92; vol. xii. p. 198.
„ Ann. d. Sc. Nat. Botan. vol. xvii. pp. 12, 13.

Pecopteris muricata.
Boulay, Terr. Houil. du Nord de la France, p. 32.
Brongniart, Hist. de Végét. Foss. p. 352, pl. xcv. figs. 3, 4; pl. xcvii.
Heer, Flora Foss. Helv. lief i. p. 33, pl. xv. fig. 3.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Sauveur, Végét. Foss. de la Belgique, pl. xliii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. i. p. 514.

Alethopteris muricata.
Bronn, Index Palæont. p. 24.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 157.
„ Canadian Nat. vol. viii. p. 446.
„ Acadian Geol. 2nd Ed. p. 242, 1868.
„ Foss. Plants Lower Carb. Canada, p. 38.
Ettingshausen, Steinkf. v. Radnitz, p. 43, pl. xiv. fig. 1.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Giebel, Deutschl. Petrefacten, p. 51.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 16.
Göppert, Syst. Fil. Foss. p. 313.
Lesquereux, Geol. of Pennsyl. vol. ii. part ii. p. 865.
„ Report, Geol. Survey of Illinois, vol. iv. p. 395.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 78, pl. xi. fig. 1.
Unger, Synop. Plant. Foss. p. 84.
„ Genera et Species, p. 152.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82 (excl. syn. *Sphenopteris latifolia*, Brongt.).

Sphenopteris muricata.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 281, pl. lxv. fig. 3 (excl. syn. *S. acutifolia*).
„ Steinkohl. u. Perm.-Ablager. p. 75.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.

Diplothmema muricatum.
Stur, Culm Flora, heft 2, p. 230.

Filicites muricatus.
Schlotheim, Flora d. Vorwelt, pp. 54, 55, pl. xii. figs. 21 and 23.
„ Petrefactenkunde, p. 409.

Pecopteris laciniata.
Crépin, Bull. Soc. Roy. d. Botan. d. Belgique, 1881, vol. xx. part ii. p. 25.
Lebour, Illustrations of Foss. Plants, p. 59, pl. xxix.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cxxii.

Pseudopecopteris muricata.
Lesquereux, Coal Flora in Pennsyl. p. 203, pl. xxxvii. fig. 2.

Pecopteris incisa.
Brongniart, Prodrome, p. 59.
Sternberg, Vers. i. fasc. iv. p. xx; Vers. ii. p. 156, pl. xxii. fig. 3.

Sphenopteris macilenta.
Lebour, Illustrations of Foss. Plants, p. 39, pl. xix.

Neuropteris heterophylla.
Lebour, Illustrations of Foss Plants, p. 29, pl. xiv.

Neuropteroid frond ?
Lebour, Illustrations of Foss. Plants, p. 31, pl. xv.

Horizon.—Coal Measures.
Localities.—*British.* Lanarkshire : Chapelhall, near Airdrie.
Foreign. Bohemia. Rhenish Prussia: Aix-la-Chapelle. Silesia: Waldenburg.

Mariopteris nervosa, Brongniart, sp.

Mariopteris nervosa.
Renault, Cours d. Botan. Foss. p. 195, 1883.
Zeiller, Végét. Foss. du Terr. Houil. p. 69, pl. clxvii. figs. 1–4 (? excl. syn. *Pecopteris Sauveurii*, Brongt.).
„ Bull. Soc. Géol. France, 3e sér. vol. vii. p. 92, pl. v., vol. xii. p. 198.

Pecopteris nervosa.
Boulay, Terr. Houil. du Nord de la France, p. 32.
Brongniart, Prodrome, p. 57 (excl. syns.).
„ Hist. d. Végét. Foss. p. 297, pl. xciv. and xcv. figs. 1, 2.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 429.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 12 and 17.
Geinitz, Gaea v. Sachsen, p. 80.
Heer, Flora Foss. Helv. lief. i. p. 33, pl. xv. figs. 1, 2.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 547.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 442.
Lindley and Hutton, Foss. Flora, vol. ii. pl. xciv.
Morris, Trans. Geol. Soc. 2 ser. vol. v. p. 488.
Schimper, Traité d. Paléont. Végét. vol. i. p. 513 (? excl. syn. *P. Sauveurii*, Brongt.).

Alethopteris nervosa.
Bronn, Index Palæont, p. 24.
Dawson, Acadian Geol. 2nd Ed. p. 242, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 157, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 446.
„ Foss. Plants Lower Carb. Canada, p. 38.
Feistmantel, Steinkf. v. Kralup in Böhmen, p. 13.
„ Steinkohl. u. Perm.-Ablager. p. 86.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 30, pl. xxxiii. figs. 2, 3.
Giebel, Deutschl. Petrefacten, p. 51.
Göppert, Syst. Fil. Foss. p. 312.
Lesquereux, Geol. of Pennsyl. vol. ii. part ii. p. 865.
Ludwig, Bull. Soc. Imp. Nat. Moscou, p. 22, 1876.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 77, pl. xxxi. fig. 7.
Sternberg, Vers. ii. p. 144.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 84.
„ Genera et Species, p. 152.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.

Pseudopecopteris nervosa.
Lesquereux, Coal Flora in Pennsyl. p. 197, pl. xxxvi. figs. 1–3.

Diplothmema nervosum.
Stur, Culm Flora, heft 2, p. 230.
„ Morph. u. Syst. d. Culm u. Carbonfarne, p. 194.

Pecopteris subnervosa.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 61.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 90, pl. xiii. fig. 5.
Römer, Palaeontographica, vol. ix. p. 36, pl. viii. fig. 11, 1862.
Schimper, Traité d. Paléont. Végét. vol. i. p. 513.

Pseudopecopteris subnervosa.
Lesquereux, Coal Flora in Pennsyl. p. 198.

Callipteris subnervosa.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 864.

Alethopteris Lindleyana.
Bronn, Index Palæont. p. 23.
Sternberg, Vers. ii. p. 145.

Sphenopteris Newberryi.
Lesquereux, Geol. of Pennsyl. vol. ii. part ii. p. 862, pl. ix. fig. 4.

Pseudopecopteris Newberryi.
Lesquereux, Coal Flora in Pennsyl. p. 202, pl. xxxvii. fig. 1.

Sphenopteris acutifolia.
Ettingshausen, Steinkf. v. Radnitz, p. 39, pl. xiv. fig. 2.

Sphenopteris latifolia, Brongt. var.
Crépin, Bull. Soc. Roy. d. Botan. de Belgique, vol. xx. part ii. p. 25, 1881.
Lebour, Illustrations of Foss. Plants, p. 63, pl. xxxi.

Pecopteris serra ?
Crépin, Bull. Soc. Roy. de Botan. de Belgique, vol. xx. part ii. p. 24, 1881.
Lebour, Illustrations of Foss. Plants, p. 45, pl. xxii.

Pecopteris (Alethopteris) aquilina.
Lebour, Illustrations of Foss. Plants, p. 33. pl. xvi.

Pecopteris (Alethopteris) marginata.
Lebour, Illustrations of Foss. Plants, p. 35, pl. xvii.

Sphenopteris macilenta, var.
Lebour, Illustrations of Foss. Plants, p. 39, pl. xix.

Remarks.—I unite here *Sphenopteris Newberryi*, Lesquereux, as it does not appear to differ in any essential point from this species.

Pecopteris nervosa, Unger (non. Brongt.), (Anthracit-Lager in Kärnthen, p. 787, pl. i, fig. 6), is altogether distinct from *P. nervosa*, Brongt., and is also excluded from this species. It appears to belong to the genus *Odontopteris*.

Mariopteris muricata and *M. nervosa* are closely related to each other, and there are cases in which it is difficult to decide as to which of these species some specimens should be referred. The beautiful example of *Mariopteris (Alethopteris) nervosa* figured by Roehl also seems to suggest that these two species may merely represent specimens from different parts of a large frond.

Horizon.—Coal Measures.

Localities.—British. Lanarkshire : Chapelhall, Airdrie. Lancashire : Oldham ; Ravenhead. Northumberland : Felling Colliery, near Newcastle-on-Tyne. Shropshire : Coalbrook Dale ; Madeley Court (Presented by H. Pearce, Esq.). Staffordshire (South) : Netherton. Worcestershire : Bewdley ; Forest of Wyre. Yorkshire : Stanley Main, near Normanton.

Foreign.—Rhenish Prussia : Aix-la-Chapelle.

Mariopteris latifolia, Brongniart, sp.

Mariopteris latifolia.
Renault, Cours d. Botan. Foss. p. 195, pl. xxi. figs. 16, 17, 1883.
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. vii. p. 92, pl. vi; vol. xii. p. 198.
„ Flore Houil. des Asturies, p. 5.

Sphenopteris latifolia.
Brongniart, Prodrome, p. 51.
„ Hist. d. Végét. Foss. p. 205, pl. lvii. figs. 1, 2, 3, 4, and 5.
Bronn, Index Palæont. (*in part*), p. 1167.
Bunbury, Amer. Journ. of Science, 2nd ser. vol. ii. p. 230, 1846.
Dawson, Geol. Survey of Canada, Reports, 1874–5, p. 196.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 597.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 300.
Giebel, Deutschl. Petrefacten, p. 44.
Göppert, Gatt. d. Foss. Pflanzen, lief. 3, 4, p. 74, pl. xiv. figs. 5, 6.
Heer, Flora Foss. Helv. lief. i. p. 17.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 863.
„ Report, Geol. Survey of Illinois, vol. ii. p. 435.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. p. 191, 1883.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 59, pl. xxxi. figs. 1, 2.
Sauveur, Végét. Foss. de la Belgique, pl. xv. fig. i. pl. xviii. fig. 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 399.
Sternberg, Vers. ii. p. 63 (excl. syns.).
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.
Unger, Synop. Plant. Foss. p. 67.
„ Genera et Species, p. 123.

Aspidites latifolia.
Göppert (*in part*), Syst. Fil. Foss. p. 356.

Pseudopecopteris latifolia.
Lesquereux, Coal Flora in Pennsyl. p. 215, pl. liii. fig. 4.

Diplothmema latifolium.
Stur, Culm Flora, heft 2, p. 230.

Remarks.—An example from Carluke, which closely approaches *Mariopteris* (*Sphenopteris*) *acuta*, Brongniart, is here regarded as a varietal form of *Mariopteris latifolia*, Brongt., sp. *Mariopteris latifolia* and *Mariopteris acuta* hold a similar relation to each other to that which I have mentioned as existing between *Mariopteris muricata*, and *Mariopteris nervosa*.
Horizon.—Coal Measures.
Localities.—*British.* Lanarkshire: Carluke.
Foreign. Silesia: Waldenburg.

Mariopteris Loshii, Brongniart, sp.

Pecopteris Loshii.
Boulay, Terr. Houil. du Nord de la France, p. 33.
Brongniart, Hist. d. Végét. Foss. p. 355, pl. xcvi. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. i. p. 516.
Sternberg, Vers. ii. p. 148.
Unger, Synop. Plant. Foss. p. 103
„ Genera et Species, p. 185.

Sphenopteris Loshii.
Brongniart, Prodrome, p. 51.
Bronn, Index Palæont. p. 1169.

Diplothmema Loshii.
Stur, Culm Flora, heft 2, p. 230.

Remarks.—This specimen, though nearly allied to *Mariopteris acuta*, Brongniart, sp., possesses more generally the characters of *M. Loshii*, Brongt., sp. It is quite possible that eventually *Mariopteris* (*Sphenopteris*) *acuta*, Brongt., sp., and *M. Loshii*, Brongt., sp., may both prove to be only varietal forms of *M. latifolia*, Brongt., sp.
Horizon.—Coal Measures.
Locality.—British. Lanarkshire : Carluke.

PECOPTERIDEÆ.

PECOPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.

Pecopteris arborescens, Schlotheim, sp.

Pecopteris arborescens.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 310, pl. cii. pl. ciii. figs. 2, 3.
„ Dict. Univer. d'Hist. Nat. vol. xiii. p. 74.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86.
Carruthers, Rep. Brit. Assoc. 1872, pt. ii. p. 99.
Crépin, Bull. Soc. Roy. Bot. de Belgique, vol. xx. pt. ii. p. 24.
Dawson, Acadian Geol. 2nd edit. p. 484, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 38, 1873.
Feistmantel, Vers. d. Böhmis Ablager, p. 292, pl. lxvii. fig. 6.
Fontaine & White, Perm. or Upper Carb. Flora, pp. 6 and 62.
Germar, Vers. v. Wett. u. Löbejun, p. 97, pls. xxxiv. xxxv. figs. (4 ?), 5, 6, 7.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 68, pl. viii. fig. 6.
Gutbier, Die Vers. d. Rothl. in Sachsen, p. 16, pl. ii. fig. 9.
Lesquereux, Geol. of Pennsyl. vol. ii. pt. ii. p. 867.
„ Coal Flora in Pennsyl. p. 230, pl. xli. figs. 6, 7.
„ Bull. Mus. Comp. Zool. Harvard Col. vol. vii. p. 244, 1882.
„ Report Geol. Survey of Illinois, vol. ii. p. 442.
Renault, Cours de Botan. Foss. vol. iii. p. 108, pl. xvii. figs. 1, 2, 2 bis, 3.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 84, pl. xxvi. fig. 3.
Römer, Palaeontographica, vol. ix. p. 35.
Rost, De Fil. Ectypis, p. 29.
Schimper, Traité d. Palæont. Végét. vol. i. p. 499.
Sternberg, Vers. ii. p. 147.
Zeiller, Princip. Végét. Foss. du Terr. Houil. p. 81, pl. clxix. fig. 4.
„ Flore Houil. des Asturies, p. 12.

Cyatheites arborescens.
Bronn, Index Palæont. p. 364.
Ettingshausen, Steink. v. Radnitz, p. 43.
Geinitz, Vers. d. Steink. in Sachsen, p. 24, pl. xxviii. figs. 7–11.
Giebel, Deutschl. Petrefacten, p. 53.
Göppert, Syst. Fil. Foss. p. 321.
Heer, Flora Foss. Helv. p. 27, pl. viii. figs. 1–4.
Sandberger. Flora d. Ober. Steink. in Badischen Schwarz. p. 2.
Unger, Synop. Plant. Foss. p. 87.
„ Genera et Species, p. 157.

Cyathocarpusarborescens.
Weiss, Foss. Flora d. jüng Steink. u. d. Rothl. p. 84.

Asterotheca arborescens.
Stur, Culm Flora, heft 2, p. 293.

Scolecopteris arborescens.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, pp. 102 and 122, fig. 20*a*.

Pecopteris arborea.
Sternberg, Vers. fasc. iv. p. xviii.

Filicites arborescens.
Schlotheim, Flora d. Vorwelt, p. 41, pl. viii. figs. 13, 14.
„ Petrefacten, p. 404.

Pecopteris cyathea.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 307, pl. ci. figs. 1–3 (excl. fig. 4).
? Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 429.
Dawson, Acadian Geol. 2nd ed. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 37, 1873.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 68, pl. viii. fig. 7.
Renault, Cours. d. Botan. Foss. vol. iii. p. 108, pl. xvii. figs. 4, 5.
Rost, De Fil. Ectypis, p. 25.
Sauveur, Végét. Foss. du Ter. Houil. de la Belgique, pl. xxxix. fig. 2.
Sternberg, Vers. ii. p. 149.
Zeiller, Princip. Végét. Foss. du Terr. Houil. p. 81, pl. clxix. figs. 5, 6.
„ Flore Houil. des Asturies, p. 12.

Asterotheca cyathea.
Stur, Culm Flora, heft 2. p. 293.

Filicites cyatheus.
Schlotheim, Flora d. Vorwelt, p. 38, pl. vii. fig. 11.
„ Petrefacten, p. 403.

Scolecopteris cyathea.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 122.

Pecopteris Schlotheimii.
Grand 'Eury, Flore Carb. du Dép. de la Loire, p. 69.
Sternberg, Vers. fasc. iv. p. xviii.

Cyatheites Schlotheimii.
Bronn, Index Palæont. p. 365.
Giebel, Deutschl. Petrefacten, p. 53.
Göppert, Syst. Fil. Foss. p. 320.
„ Foss. Flora d. Perm. Form. p. 120, pl. xv. fig. 1, pl. xvi. figs. 1, 4.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 83.
Unger, Synop. Plant. Foss. p. 86.
„ Genera et Species, p. 156.

Pecopteris platyrachis.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 312, pl. ciii. figs. 4 and 5.
Bronn, Index Palæont. p. 365.

Pecopteris aspidioides.
Brongniart, Hist. d. Végét. Foss. p. 311, pl. cxii. fig. 2.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 403.

Pecopteris leptorrhachis.
Bronn, Index Palæont. p. 916.
Giebel, Deutschl. Petrefacten, p. 58.
Unger, Synop. Plant. Foss. p. 98.
„ Genera et Species, p. 175.

Aspidites leptorrhachis.
Göppert, Syst. Fil. Foss. p. 373, pl. xxiii. fig. 2.

Pecopteris nodosa.
Bronn, Index Palæont. p. 917.
Giebel, Deutschl. Petrefacten, p. 58.
Lesquereux, Coal Flora in Pennsyl. p. 233.
Rost, De Fil. Ectypis, p. 27.
Schimper, Traité d. Paléont. Végét. vol. i. p. 500.
Unger, Synop. Plant. Foss. p. 98.
„ Genera et Species, p. 175.

Aspidites nodosus.
Göppert, Syst. Fil. Foss. p. 372, pl. xxiii. fig. 1.

Asplenites nodosus.
Göppert, Syst. Fil. Foss. p. 280, pl. xix. figs. 1–3.
Unger, Synop. Plant. Foss. p. 75.
„ Genera et Species, p. 138.

Pecopteris decussata.
Bronn, Index Palæont. p. 915.
Giebel, Deutschl. Petrefacten, p. 57.
Unger, Synop. Plant. Foss. 97.
„ Genera et Species, p. 173.

Goniopteris decussata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 543.

Steffensia decussata.
Sternberg, Vers. ii. p. 123.

Aspidites decussatus.
Göppert, Syst. Fil. Foss. p. 369, pl. xxvi. figs. 1, 2.

Filicites affinis.
Schlotheim, Flora d. Vorwelt, p. 43, pl. viii. fig. 14.
„ Petrefactenkunde, p. 404.

Remarks.—The specimen from the Sandwell Park Boring agrees entirely with the description and figure of *Asplenites nodosus* given by Göppert. I regard it, however, as merely a badly-preserved specimen of *Pecopteris arborescens* in fructification.

Horizon.—Coal Measures.

Localities.—*British.* Gloucestershire: Forest of Dean. Somersetshire: Radstock. Staffordshire: Sandwell Park Trial Boring, West Bromwich.

Foreign. Bohemia. France: St. Chaumont, Lyons; Chazotte, St. Etienne (Presented by M. C. Chantre); Bourg d'Oisans. Germany: Ilmenau. Moravia: Rossitz; Podutha. Piedmont: Colle di Balme (Presented by Sir Henry T. De la Beche). Prussia: Metzebach. Saxony: Wettin; Zwickau. Switzerland: Chamouni. Tuscany: Yano (Presented by J. G. Pentland, Esq.) United States: Illinois, Grundy Co.; Pennsylvania.

Pecopteris Candolliana, Brongniart.

Pecopteris Candolliana.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 305, pl. c. fig. 1.
Fontaine and White, Perm. or Upper Carbon. Flora, p. 20 and p. 63, pl. xx. fig. 1 (2, 3 ?).
Germar, Vers. v. Wett. u. Löbejun, p. 108, pl. xxxviii.

Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 69, pl. viii. fig. 8.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 401.
„ Coal Flora in Pennsyl. p. 243.
Renault, Cours d. Botan. Foss. vol. iii. p. 109, pl. xvii. figs. 7, 8, 8 bis.
Römer, Palaeontographica, vol. ix. p. 35.
Rost, De Fil. Ectypis, p. 25.
Schimper, Traité de Paléont. Végét. vol. i. p. 500.
Sternberg, Vers. ii. p. 148.

Pecopteris Candollei.
Zeiller, Princip. Végét. Foss. du Ter. Houil. p. 84.

Cyatheites Candollianus.
Bronn, Index Palæont. p. 364.
Geinitz, Vers. d. Steink. in Sachsen, p. 24, pl. xxviii. figs. 12 13.
Giebel, Deutschl. Petrefacten, p. 53.
Göppert, Syst. Fil. Foss. p. 321.
„ Foss. Flora d. Perm. Form. p. 119.
Heer, Flora Foss. Helv. p. 28, pl. viii. fig. 9.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 83, pl. xii. fig. 3 *b*.
Unger, Synop. Plant. Foss. p. 87.
„ Genera et Species, p. 157.

Cyathocarpus Candolleanus.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 85.

Asterotheca Candolleana.
Stur, Culm Flora, heft 2, p. 293.

Pecopteris lepidorachis.
Brongniart, Hist. d. Végét. Foss. p. 313, pl. ciii. fig. 1.
Lesquereux, Report Geol. Survey of Illinois, vol. ii. p. 442.
Renault, Cours d. Botan. Foss. vol. iii. p. 111, pl. xviii. figs. 9, 10.
Sternberg, Vers. ii. p. 149.

Cyatheites lepidorrachis.
Bronn, Index Palæont. p. 364.
Giebel, Deutschl. Petrefacten, p. 53.
Göppert, Syst. Fil. Foss. p. 302.
Unger, Synop. Plant. Foss. p. 87.
„ Genera et Species, p. 157.

Pecopteris affinis.
Brongniart, Hist. d. Végét. Foss. p. 306, pl. c. figs. 2, 3 (excl. syn.)
Renault, Cours d. Botan. Foss. vol. iii. p. 109, pl. xvii. fig. 6.

Pecopteris cyathea.
Brongniart (*in part*), Hist. d. Végét. Foss. pl. ci. fig. 4.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 68, pl. viii. fig. 7.

Pecopteris arborescens.
? Germar, Vers. v. Wett. u. Löbejun, pl. xxxiv. fig. 4.

Scolecopteris Candolleana.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 123.

Horizon.—Coal Measures.
Localities.—*British.* Worcestershire: Forest of Wyre.
Foreign. Bohemia. France: St. Jean, Nimes; Chazotte, St. Etienne (Presented by M. C. Chantre). Prussia: Saarbrück. Saxony: Wettin.

Pecopteris pteroides, Brongniart.

Pecopteris pteroides.
Brongniart, Prodrome, p. 57.
„ Hist. d. Végét. Foss. p. 329, pl. xcix. fig. 1.

Fontaine and White, Perm. or Upper Carb. Flora, p. 20 and p. 67.
Germar, Vers. v. Wett. u. Löbejun, p. 103, pl. xxxvi.
Grand 'Eury, Flore Carbon du Dép. de la Loire, p. 75.
Lesquereux, Report Geol. Survey of Illinois, vol. ii. p. 441.
„ Coal Flora in Pennsyl. p. 249.
Renault, Cours d. Botan. Foss. vol. iii. p. 118.
Rost, De Fil. Ectypis, p. 25.
Schimper, Traité d. Paléont. Végét. vol. i. p. 508.
Sternberg, Vers. ii. p. 148.

Alethopteris pterodes.
Dawson, Acadian Geol. 2nd edit. p. 242, 1868.
? Geinitz, Vers. d. Steink. in Sachsen, p. 28 (excl. figs.).
Giebel, Deutschl. Petrefacten, p. 51.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 80.
Sandberger, Flora d. Steink. im Badischen Schwarzk. pp. 3, 4, 5.

Asterocarpus pteroides.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 91.

Alethopteris Brongniartii.
Bronn, Index Palæont. p. 23.
Göppert, Syst. Fil. Foss. p. 314.
Unger, Synop. Plant. Foss. p. 84.
„ Genera et Species, p. 153.

Scolecopteris pteroides.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 125.

Remarks.—The specimen of this fern in the Collection shows very clearly the characters of the species. The pinnules are free and slightly rounded at their base, the veins are very numerous, fine, and dichotomise twice. The midrib of the pinnule is well defined. In form the pinnules are oblong, and gradually narrowed towards their obtuse apex. None of the figures given by Geinitz* as *Alethopteris pteroides* belong to Brongniart's plant. This fact has already been pointed out by several authors.
Horizon.—Coal Measures.
Locality.—British : near Bath, Somerset.

Pecopteris Bucklandii, Brongniart.

Pecopteris Bucklandii.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 319, pl. xcix. fig. 2.
Dawson, Acadian Geol. 2nd. Ed. p. 485, 1868.
„ Fossil Plants of Lower Carb. Canada, p. 37, 1873.
Fontaine and White, Perm. or Upper Carb. Flora, p. 20.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 75.
Lesqueraux, Report Geol. Survey of Illinois, vol. iv. p. 401.
„ Coal Flora in Pennsyl. p. 244.
Lindley and Hutton, Fossil Flora, vol. iii. pl. ccxxiii.
Renault, Cours de Bot. Foss. vol. iii. p. 117.
Schimper, Traité d. Paléont. Végét. vol. i. p. 504.
Sternberg, Vers. ii. p. 156.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 64.
Zeiller, Flore Houil. des Asturies, p. 15.

Alethopteris Bucklandii.
Bronn, Index Palæont. p. 23.
Göppert, Synop. Fil. Foss. p. 314.
Roehl. Foss. Flora d. Steink. Form. Westphalens, p. 78.

* Vers. d. Steink. in Sachsen, figs. 1–5.

Unger, Synop. Plant. Foss. p. 84.
„ Genera et Species, p. 152.

Scolecopteris Bucklandi.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 124.

Pecopteris pseudo-bucklandi.
Germar, Vers. v. Wett. u. Löbejun, p. 106, pl. xxxvii.
Römer, Palaeontographica, vol. ix. p. 35.
Schimper, Traité d. Paléont. Végét. vol. i. p. 504.

Scolecopteris pseudo-bucklandi.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 125.

Horizon.—Coal Measures.
Locality.—British: near Bath, Somersetshire.

Pecopteris oreopteridia, Schlotheim, sp.

Pecopteris oreopteridia.
Fontaine and White, Perm. or Upper Carb. Flora, p. 64.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 71.
Renault, Cours de Bot. Foss. vol. iii. p. 110, pl. xviii. figs. 5, 5 bis, pl. xix. figs. 7–12.
Schimper, Traité d. Paléont. Végét. vol. i. p. 502.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 66.
Zeiller, Flore Houil. des Asturies, p. 12.
„ Bul. Soc. Géol. France, 3e sér. vol. viii. p. 198.

Pecopteris oreopteridius.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 317, pl. civ. figs. 1, 2, pl. v. figs. 1, 2, 3.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Römer, Palaeontographica, vol. ix. p. 35.
Rost, De Fil. Ectypis, p. 28.

Pecopteris oreopteridis.
Lesquereux, Report Geol. Survey of Illinois, vol. ii. p. 442.
„ Geol. of Pennsyl. vol. ii. part ii. p. 866.
„ Coal Flora in Pennsyl. p. 238, pl. xli. fig. 8.
Sternberg, Vers. i. p. xix. ii. p. 149, pl. xxii. fig. 4.

Cyatheites oreopteridis.
Ettingshausen, Steinkf. v. Radnitz, p. 43, pl. xv. fig. 2.
Feistmantel, Steink. v. Kralup in Böhmen, p. 23.
„ Vers. d. Böhm. Ablager. p. 294.
Giebel, Deutschl. Petrefacten, p. 53.
Goppert, Syst. Fil. Foss. p. 323.
„ Foss. Flora d. Perm. Form. p. 122.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 85.
Unger, Synop. Plant. Foss. p. 87.
„ Genera et Species, p. 158.

Cyatheites oreopteridius.
Heer, Flora Foss. Helv. p. 30, pl. viii. fig. 8.

Filicites oreopteridius.
Schlotheim, Flora d. Vorwelt, p. 36, pl. vi. fig. 9.
„ Petrefactenkunde, p. 407.

Pecopteris oreopteroides.
Dawson, Acadian Geol. 2nd Ed. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, pp. 37, 38, 1873.

Cyatheites oreopteroides.
Bronn, Index Palæont. p. 364.
Geinitz, Vers. d. Steink. in Sachsen, p. 25, pl. xviii. fig. 14.

Alethopteris oreopteridis.
Sternberg, Vers. ii. p. 145.

Pecopteris aspidioides.
Sternberg, Vers. i. p. xx, pl. l. fig. 5.

Horizon.—Coal Measures.
Locality.—British. Gloucestershire: Forest of Dean. Shropshire: Madeley Court (Presented by H. Pearce, Esq.) Worcestershire: Forest of Wyre. Somersetshire: Radstock.
Foreign. Saxony: Zwickau.

Pecopteris villosa, Brongniart.

Pecopteris villosa.
Brongniart, Hist. d. Végét. Foss. p. 316, pl. xiv. fig. 3.
Dawson, Acadian Geol. 2nd Ed. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 37, 1873.
Fontaine and White, Perm or Upper Carb. Flora, p. 16.
Lesquereux, (?) Coal Flora in Pennsyl. p. 253.
„ Report Geol. Survey of Illinois, vol. ii. p. 442.
Römer, Palaeontographica, vol. ix. p. 36.
Schimper, Traite d. Paléont. Végét. vol. i. p. 503.
Sternberg, Vers. ii. p. 160.
Zeiller, Flore Houil. des Asturies, p. 12.

Cyatheites villosus.
Bronn, Index Palæont. p. 365.
Geinitz, Vers. d. Steinkh. in Sachsen, p. 25, pl. xxix, figs. 6-8.
Göppert, Syst. Fil. Foss. p. 323.
Heer, Flora Foss. Helv. p. 30.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 87.
Unger, Synop. Plant. Foss. p. 87.
„ Genera et Species, p. 158.

Danæites villosus.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 150.

Remarks.—It is very doubtful if *Pecopteris villosa*, Brongt. should be regarded as a species. In the type specimen no trace of the veins is shown, thus we are ignorant of one of the most important characters for comparing it with the other Pecopteroids, to which it very closely stands. I have latterly regarded it as only a condition of *Pecopteris oreopteridia*, from which in general outline it does not appear to differ. Zeiller,* although coming to no definite conclusion, thinks it may perhaps belong to *Pecopteris abbreviata*, as he has observed on specimens of that plant a similar villose character. In the meantime a provisional specific position has been accorded it, awaiting further data for the decision of its real place, whether specific or only varietal.
Horizon.—Coal Measures.
Locality.—British. Yorkshire (?).

Pecopteris polymorpha, Brongniart.

Pecopteris polymorpha.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 331, pl. cxiii. (fig. 2 ?).
? Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 429.
Dawson, Acadian Geol. 2nd edit. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 36, 1873.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 74, pl. viii. figs. 10, 11.

* Flore Houil. des Asturies, p. 13.

Lesquereux, Report Geol. Survey of Illinois, vol. ii. p. 441.
„ Geol. of Pennsyl. vol. ii. pt. ii. p. 866.
Renault, Cours d. Botan. Foss. vol. iii. p. 116, pl. xx. figs. 1–10.
Rost, De Fil. Ectypis, p. 26.
Schimper, Traité d. Paléont. Végét. vol. i. p. 506 (excl. syn. *P. abbreviata*).
Zeiller, Princip. Végét. Foss. du Terr. Houil. p. 91, pl. clxix. figs. 1, 2, 3.
„ Flore Houil. des Asturies, p. 15.

Hawlea polymorpha.
Stur, Culm Flora, heft 2, p. 293.

Scolecopteris polymorpha.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 107, fig. 21.

Remarks.—In the barren condition there are no satisfactory characters by which this and the two following species can be distinguished; their similarity in this state is so great, that several authors have united them. In the fructifying condition, however, *Pecopteris polymorpha*, Brongt. is essentially distinct from *Pecopteris Miltoni*, Artis, and *Pecopteris abbreviata*, Brongt. In all three species the fruit is placed in stellate groups of from three to five sporangia. In *Pecopteris polymorpha* the sporangia are produced upwards and end in a setaceous point, in the two other species they rise little above the surface of the pinnule. In *Pecopteris abbreviata*, according to Zeiller,* the sporangia cover the whole lower surface of the pinnule. In *Pecopteris Miltoni*, they form one row, placed about midway between the margin of the pinnule and the central vein. Zeiller gives as the distinguishing character of *P. abbreviata*, Brongt., from *P. Miltoni*, Artis, sp.; that in the former the fruit covers the whole of the under surface of the pinnule, whereas in the latter it is marginal. In proof, he cites the original figure of *Pecopteris Miltoni*, Artis, sp., where the fruit is shown to be placed on the margins of the pinnules; but this is an error of the draughtsman, for Artis, in speaking of his plant says, "the fructifications seated on the back of the leaves are not so closely seated on the margin as is expressed on the plate, neither is the rib so round as represented."† There is in the Collection a very fine specimen of *Pecopteris Miltoni*, Artis, sp., in fruit, from the Forest of Wyre. The sporangia are large, and although the groups form only a single row, they occupy nearly the whole space between the midrib and the margin of the pinnule, so really they cover the whole of the lower surface of the pinnule. This specimen occurs with well-preserved barren examples of *Pecopteris Miltoni*, I therefore feel quite convinced that the fruiting specimens belong to that species. I think it probable, that eventually *Pecopteris Miltoni* and *Pecopteris abbreviata* will be found to form only one species, and that Zeiller has been misled, by the figure given by Artis, as to the fruit being marginal in *P. Miltoni*, but at present I keep them separate until the differences indicated in their fructification be more fully investigated.

Horizon.—Coal Measures.

Localities.—*British.* Northumberland: Newcastle-on-Tyne. Somersetshire: Camerton.
Foreign. Bohemia: Podutha. France: Chazotte, St. Etienne. United States: Illinois, Mazon Creek, Grundy Co.

Pecopteris Miltoni, Artis, sp.

Pecopteris Miltoni.
Boulay, Ter Houil. du Nord de la France, p. 31.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 333, pl. cxiv.
Fontaine and White, Perm. or Upper Carb. Flora, p. 65, pl. xxiii. figs. 2, 3.

* Flore Houil. des Asturies, p. 12.
† Artis, *l.c.* p. 14.

Germar, Vers. v. Wett. u. Löbejun, p. 63, pl. xxvii. (excl. syn. *P. marginata*).
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 74, pl. viii. figs. 10, 11.
Lesquereux, Coal Flora in Pennsyl. p. 247, pl. xli. fig. 9.
Römer, Palaeontographica, vol. ix. p. 34.
Schimper, Traité d. Paléont. Végét. vol. i. p. 505.
Sternberg, Vers. ii. p. 151.

Cyatheites Miltoni.
Bronn, Index Palæont. p. 364.
Feistmantel, Steink. v. Kralup in Böhmen, p. 23.
„ Vers. d. Böhm. Ablager. p. 294.
Geinitz, Vers. d. Steink. in Sachsen, p. 27, pl. xxx. figs. 5 and 8, pl. xxxi. figs. 1–4.
Giebel, Deutschl. Petrefacten, p. 54.
Göppert, Syst. Fil. Foss. p. 324.
Heer, Flora Foss. Helv. p. 28.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 85.
Sandberger, Flora d. Ober. Steink. im Badischen Schwarzk. p. 2, 4.
Unger, Synop. Plant. Foss. p. 88 (excl. syn. *P. polymorpha*).
„ Genera et Species, p. 158 (excl. syn. *P. polymorpha*).

Hawlea Miltoni.
Stur, Culm Flora, heft 2, p. 293.
„ Morph. u. Syst. d. Culm u. Carbonfarne, p. 51, fig. 13, *a*, *b*.

Filicites Miltoni.
Artis, Antedil. Phytol. pl. xiv.

Pecopteris crenata.
Bronn, Index Palæont. p. 915.
Giebel, Deutschl. Petrefacten, p. 59.
Sternberg, Vers. i. p. xx. pl. x. fig. 7, ii. p. 154.
Unger, Synop. Plant. Foss. p. 103.
„ Genera et Species, p. 186.

Hawlea pulcherrima.
Corda, Flora d. Vorwelt, p. 90, pl. lvii. figs. 7, 8.
Giebel, Deutschl. Petrefacten, p. 68.
Renault, Cours de Bot. Foss. vol. iii. p. 84, pl. xii. figs. 9, 10.
Schimper, Traité d. Paléont. Végét. vol. i. p. 586, pl. xli. figs. 1, 2.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne p. 54, fig. 13, *c*, *d*.
Unger, Genera et Species, p. 209.

Remarks.—The fruiting example of *Pecopteris Miltoni* from the Forest of Wyre, both in the general outline of the fern and in the arrangement of the sporangia, agrees in all respects with Corda's figure of *Hawlea elegans*, only in the British specimen the fruit is somewhat more perfect. I have therefore united this species with *Pecopteris Miltoni*. I also include here *Pecopteris crenata*, Presl., which does not differ from *P. Miltoni* in any appreciable manner.

Horizon.—Coal Measures.

Localities.—*British.* Gloucestershire: Forest of Dean. Worcestershire: Bewdley Forest, Clee Hills (Presented by H. G. Lyons, Esq.), Forest of Wyre.
Foreign. Bohemia.

Pecopteris abbreviata, Brongniart.

Pecopteris abbreviata.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 337, pl. cxv. figs. 1–4.
Bronn, Index Palæont. p. 914.

Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 429.
Dawson, Acadian Geol. 2nd ed. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, pp. 34, 36, 1873.
Giebel, Deutschl. Petrefacten, p. 59.
Göppert, Foss. Flora d. Perm. Form. p. 124.
? Lesquereux, Coal Flora in Pennsyl. p. 248, pl. xlvi. figs. 4–6.
„ Geol. of Pennsyl. vol. ii. pt. ii. p. 867.
„ Report Geol. Survey of Illinois, vol. iv. p. 403.
Lindley and Hutton, Fossil Flora, vol. iii. pl. clxxxiv.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Römer, Palaeontographica, vol. ix. p. 34.
Sternberg, Vers. ii. p. 152.
Unger, Syn. Plant. Foss. p. 101.
„ Genera et Species, p. 180.
Zeiller, Princip. Végét. Foss. du Terr. Houil. p. 85.
„ Flore Houil. des Asturies, p. 12.
„ Fougères du Terr. Houil. du Nord de la France, p. 200.

Pseudopecopteris abbreviata.
Lesquereux, Coal Flora in Pennsyl. p. 203.

Hawlea abbreviata.
Stur, Culm Flora, heft 2, p. 293.

Remarks.—The value of the specific distinctions of this species have been already discussed in the remarks on *Pecopteris polymorpha*, Brongt.
Horizon.—Coal Measures.
Localities.—*British.* Somersetshire : Radstock. Staffordshire : Sandwell Park Trial Sinking, West Bromwich.

Pecopteris unita, Brongniart.

Pecopteris unita.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 342, pl. cxvi. figs. 1–5.
Dawson, Acadian Geol. 2nd ed. p. 485, 1868.
„ Fossil Plants of Lower Carb. Canada, p. 38, 1873.
Giebel, Deutschl. Petrefacten, p. 58.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 76, pl. viii. fig. 13 *b*.
Lesquereux, Geol. of Pennsyl. vol. ii. pt. ii. p. 867.
„ Report Geol. Survey of Illinois, vol. ii. p. 442.
„ Coal Flora of Pennsyl. p. 223, pl. xl. figs. 1–7.
Presl in Sternberg, Vers. ii. Fasc. 7, 8, p. 158.
Renault, Cours. d. Botan. Foss. vol. iii. p. 119, pl. xx. figs. 11–19.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 90.
Römer, Palaeontographica, vol. ix. p. 34.
Schimper, Traité d. Paléont. Végét. vol. i. p. 505.
Unger, Synop. Plant. Foss. p. 102.
„ Genera et Species, p. 183.

Cyatheites unitus.
Bronn, Index Palæont. p. 365,
Geinitz, Vers. d. Steink. in Sachsen, p. 25, pl. xxix. figs. 4, 5.
Sandberger, Flora d. Steink. im Badischen Schwarzk. pp. 3, 4, 5.

Cyathocarpus unitus.
Weiss, Foss. Flora d. jüng. Steink. u. Rothl. p. 88, pl. xii. figs. 5, 6.

Oligocarpia unita.
Stur, Culm Flora, heft 2, p. 294.

Diplazites unitus.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 143.

Pecopteris longifolia.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 273, pl. lxxxiii. fig. 2.
? Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 428.
Germar, Vers. v. Wett. u. Löbejun, p. 34, pl. xiii. figs. 2–4.
Lesquereux, Coal Flora in Pennsyl. p. 226.
Römer, Palaeontographica, vol. ix. p. 36.
Rost, De Fil. Ectypis, p. 30.
Sternberg, Vers. ii. p. 158.

Desmophlebis longifolia.
Brongniart, Dict. Univer. d'Hist. Nat. vol. xiii. p. 72.

Diplazites longifolius.
Bronn, Index Palæont. p. 426.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. pp. 82 and 90.
Göppert, Syst. Fil. Foss. p. 275.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 143.
Unger, Synop. Plant. Foss. p. 74.
„ Genera et Species, p. 136.

Goniopteris longifolia.
Fontaine and White, Perm. or Upper Carb. Flora, p. 82.
Schimper, Traité d. Paléont. Végét. vol. i. p. 544.

Alethopteris longifolia.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 469.

Stichopteris longifolia.
Weiss, Foss. Flora d. jüng. Steink. u. Rothl. p. 97, pls. ix. x. figs. 7, 8.

Pecopteris emarginata.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 82, pl. vi. 1846.
Lesquereux, Coal Flora in Pennsyl. p. 225, pl. xxxix. fig. 11.
Renault, Cours d. Botan. Foss. p. 119.
Sternberg, Vers. ii. p. 158.

Diplazites emarginatus.
Bronn, Index Palæont. p. 426.
Göppert, Syst. Fil. Foss. p. 274, pl. xvi. figs. 1, 2,
Stur. Morph. u. Syst. d. Culm u Carbonfarne, p. 143.
Unger, Synop. Plant. Foss. p. 73.
„ Genera et Species, p. 136.

Goniopteris emarginata.
Fontaine and White, Perm. or Upper Carb. Flora, p. 82.
Schimper, Traité d. Paléont. Végét. vol. i. p. 544.

Alethopteris emarginata.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 398, pl. xiii. fig. 4.

Oligocarpia emarginata.
Stur, Culm Flora, heft 2, p. 294.

Pecopteris elegans.
Germar, Vers. v. Wett. u. Löbejun, p. 39, pl. xv.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 403.
Renault, Cours d. Botan. Foss. vol. iii. p. 118.

Goniopteris elegans.
Fontaine and White, Perm. or Upper Carb. Flora, p. 82.
Schimper, Traité d. Paléont. Végét. vol. i. p. 542.

Oligocarpia elegans.
Stur, Culm Flora, heft 2, p. 294.

Pecopteris lanceolata.
Lesquereux, Coal Flora in Pennsyl. p. 227, pl. xxxix. figs. 9, 10.

Alethopteris lanceolata.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 398, pl. xiii. figs. 1–3.

Goniopteris elliptica.
Fontaine and White, Perm. or Upper Carb. Flora, p. 83, pl. xxx. fig. 1.

Goniopteris oblonga (*?*).
Fontaine and White, Perm. or Upper Carb. Flora, p. 83, pl. xxx. figs. 3–5.

Remarks.—The pinnæ in this species differ much in appearance, being entire or pinnate, according to their position on the frond.

Pecopteris longifolia, Brongt., is referrable to his *Pecopteris unita*. In the true *Alethopteris* (*P.*) *longifolia*, Sternb.,* the veins are only once forked, whereas in *P. unita*, Brongt., the main vein, throughout its whole course, gives off several simple lateral veinlets, which extend to the margin of the pinna when the pinnules are confluent, or to the apex of the pinnule where they are separate.

Stur,† in referring to *P.* (*Diplazites*) *unita*, says it is an imperfectly and little-known species, whose relation to *P.* (*Diplazites*) *longifolius*, Brongt., and *P.* (*Diplazites*) *emarginata*, Göpp. sp., is still undecided.

Weiss places the figure of *Pecopteris emarginata*, given by Bunbury,‡ under *P.* (*Stichopteris*) *longifolia*, but Bunbury's figure, pl. vi. fig. 4, is identical in all essential respects with the figure of *Pecopteris* (*Cyathocarpus*) *unita* given by Weiss on his pl. xii. fig. 5, so if these two ferns are really specifically distinct, he appears to be in error in writing *P. emarginata*, Bunbury, with his *P.* (*Stichopteris*) *longifolia*.

Lesquereux, after comparing the characters of *P. elegans*, Germar, and *P. unita*, Brongt., says: "After the examination of many hundred specimens, it is impossible to point out a single trait which could be described as distinctive of one of these species. I therefore consider this *P. elegans*, Germar, as a variety of *P. unita*, Brongt."§

Pecopteris lanceolata, Lesqx. appears to be merely the upper portion of a frond of *P. unita*, Brongt., and similar to what has been figured by Weiss as *P.* (*Stichopteris*) *longifolia*.‖

Many Authors regard *P. unita*, Brongt., *P. longifolia*, Brongt. (non Sternb.), *P. emarginata*, Göpp. sp., and *P. elegans*, Germar, as distinct species, but though I have examined a number of specimens, both Foreign and British, I am unable to find any definite character by which they can be distinguished, and therefore include them all under *P. unita*, Brongt.

Horizon.—Coal Measures.

Localities.—Foreign. France: Saône-et-Loire, Blanzy; Allier. Saxony: Wettin. United States: Mount Carbon, Pennsylvania; Illinois, Mazon Creek, Grundy Co.

Pecopteris Defrancii, Brongniart.

Pecopteris Defrancii.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 325, pl. cxi. pl. cxii. fig. 1.
Heer, Flora Foss. Helv. p. 35.
Rost, De Fil. Ectypis, p. 25.

Alethopteris Defrancii.
Bronn, Index Palæont. p. 23.
Göppert, Syst. Fil. Foss. p. 317.

* Vers. pl. xxxvi. fig. 1.
† Morph. u. Syst. d. Culm u. Carbonfarne, p. 143.
‡ Quart. Journ. Geol. Soc. vol. ii. pl. vi.
§ Report Geol. Survey of Illinois, vol. iv. p. 403.
‖ *Loc. cit.* pls. ix. x. figs. 7, 8.

Giebel, Deutschl. Petrefacten, p. 52.
Sternberg, Vers. ii. p. 145.
Unger, Synop. Plant. Foss. p. 85.
„ Genera et Species, p. 154.

Pecopteris Nestleriana.
Brongniart, Hist. d. Végét. Foss. p. 327, pl. cxii. fig. 4.

Alethopteris Nestleriana.
Bronn, Index Palæont. p. 24.
Göppert, Syst. Fil. Foss. p. 318.
Unger, Synop. Plant. Foss. p. 85.
„ Genera et Species, p. 155.

Horizon.—Coal Measures.
Locality.—Unknown.

Pecopteris fertilis, Grand 'Eury.

Pecopteris fertilis.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 72, pl. viii. fig. 12.

Scolecopteris fertilis.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 124.

Horizon.—Coal Measures.
Locality.—Foreign. France: Chazotte, St. Etienne.

Pecopteris Pluckenetii, Schlotheim, sp.

Pecopteris Pluckenetii.
Boulay, Ter Houil. du Nord de la France, p. 32.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 355, pl. cvii. figs. 1–3.
Bronn, Index Palæont. p. 917.
Dawson, Acadian Geol. 2nd ed. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 37, 1873.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 17, 20, 67, pl. xxi. figs. 4, 5.
Germar, Vers. v. Wett. u. Löbejun, p. 41, pl. xvi.
Giebel, Deutschl. Petrefacten, p. 56.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 61.
Heer, Flora Foss. Helv. p. 34, pl. x. fig. 6, pl. xiv. figs. 1–5, pl. xv. fig. 4.
Renault, Cours d. Bot. Foss. vol. iii. p. 124, pl. xxi. figs. 6–9.
Römer, Palaeontographica, vol. ix. p. 33.
Rost, De Fil. Ectypis, p. 29.
Schimper, Traité de Paléont. Végét. vol. i. p. 511, vol. iii. p. 495.
Sternberg, Vers. i. p. xix. ii. p. 150.
Unger, Synop. Plant. Foss. p. 96.
„ Genera et Species, p. 170.
Zeiller, Végét. Foss. du Terr. Houil. p. 90, pl. clxviii. figs. 1, 2.
„ Flore Houil. des Asturies, p. 15.
„ Ann. d. Scienc. Nat. 6e Ser. Bot. vol. xvi. p. 201.

Alethopteris Pluckenetii.
Feistmantel, Vers. d. Böhmischen Ablag. p. 295.
Geinitz, Vers. d. Steink. in Sachsen, p. 30, pl. xxxiii. figs. 4, 5.
„ Flora d. Hainich.—Ebersdorfer, p. 45.
Lesquereux, Report Geol. Survey of Illinois, vol. iv. p. 395.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 80.

Cyatheites Pluckenetii.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 67.

Pseudopecopteris Pluckenetii.
Lesquereux, Coal Flora in Pennsyl. p. 199, pl. xxxiv. fig. 4, pl. xxxv. fig. 7.

Aspidites Pluckenetii.
Göppert, Syst. Fil. Foss. p. 358.

Filicites Pluckenetii.
Schlotheim, Flora d. Vorwelt, p. 52, pl. x. fig. 19.
„ Petrefactenkunde, p. 410.

Pecopteris bifurcata.
Sternberg, Vers. i. p. xix. pl. lix. fig. 2, pl. ii. p. 151.

Sphenopteris bifurcata.
Bronn, Index Palæont. p. 1167.
Giebel, Deutschl. Petrefacten, p. 45.
Unger, Syn. Plant. Foss. p. 68.
„ Genera et Species, p. 125.

Horizon.—Coal Measures.
Localities.—Foreign. Bohemia. Moravia: Rossitz. Saxony: Zwickau. Switzerland: Chamouni (Presented by A. Wills, Esq.).

Pecopteris arguta, Brongniart.

Pecopteris arguta.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 303, pl. cviii. figs. 3, 4.*
Bronn, Index Palæont. p. 914.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 77.
Lesquereux, Geol. of Pennsyl. vol. ii. part ii. p. 867.
„ Report Geol. Survey of Illinois, vol. iv. p. 403.
„ Coal Flora in Pennsyl. p. 237, pl. xli. figs. 2, 3.
Renault, Cours d. Botan. Foss. vol. iii. p. 120, pl. xx. figs. 20, 21.
Römer, Palaeontographica, vol. ix. p. 34.
Rost, De Fil. Ectypis, p. 29.
Schimper, Traité d. Paléont. Végét. vol. i. p. 521.
Sternberg Vers. i. fasc. iv. p. xix, ii. p. 157.
Unger, Synop. Plant. Foss. p. 96.
„ Genera et Species, p. 171.
Zeiller, Princip. Végét. Foss. du Terr. Houil. p. 93, pl. clxvi. figs. 5, 6
Zeiller, Flore Houil. des Asturies, p. 12.

Cyatheites argutus.
Geinitz, Vers. d. Steinkohl. in Sachsen, p. 24, pl. xxix. figs. 1–3.
Feistmantel, Steinkf. v. Kralup in Böhmen, p. 24.

Aspidites arguta.
Göppert, Syst. Fil. Foss. p. 359.

Goniopteris arguta.
Fontaine & White, Perm. or Upper Carb. Flora, p. 82.
Schimper, Traité d. Paléont. Végét. vol. i. p. 543.

Filicites fœminæformis.
Schlotheim, Flora d. Vorwelt, p. 46, pl. ix. fig. 16.
„ Petrefactenkunde, p. 407.

Oligocarpia fœminæformis.
Stur, Culm Flora, heft 2, p. 294.

* See Zeiller, *l.c.* Princip. Végét. Foss. p. 93.

Cyatheites elegans.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 69 (in part).
Polypodites elegans.
Bronn, Index Palæont. p. 1027.
Giebel, Deutschl. Petrefacten, p. 56.
Göppert, Syst. Fil. Foss. p. 344, pl. xv. fig. 10.
Unger, Synop. Plant. Foss. p. 94.
„ Genera et Species, p. 168 (in part).
Goniopteris Newberriana.
Fontaine and White, Perm. or Upper Carb. Flora, p. 84, pl. xxx. fig. 2.
Horizon.—Coal Measures.
Localities.—Foreign. Moravia: Rossitz. United States: Mount Carbon. Pennsylvania.

Pecopteris ovata, Brongniart.

Pecopteris ovata.
Brongniart, Prodrome, p. 58,
„ Hist. d. Végét. Foss. p. 328, pl. cvii. fig. 4.
Schimper, Traité d. Palæont. Végét. vol. i. p. 510.
Sternberg, Vers. ii. p. 150.
Alethopteris ovata.
Bronn, Index Palæont. p. 24.
Giebel, Deutschl. Petrefacten, p. 51.
Göppert, Syst. Fil. Foss. p. 315.
Schimper, Traité d. Paléont. Végét. vol. i. p. 559.
Unger, Synop. Plant. Foss. p. 85.
„ Genera et Species, p. 153.
Callipteridium ovatum.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 109.
Zeiller, Princip. Végét. Foss. du Terr. Houil. p. 66, pl. clxvi. figs. 3, 4.
Neuropteris ovata.
Germar, Vers. v. Wett. u. Löbejun, p. 33, pl. xii.
Neuropteris mirabilis.
Römer, Palaeontographica, vol. ix. p. 28.
Rost, De Fil. Ectypis, p. 23.
Callipteridium mirabile.
Weiss, Zeitsch. d. Deut. Geol. Gesellsch. vol. xxii. p. 877.
Neuropteridium mirabile.
Weiss, Zeitsch. d. Deut. Geol. Gesellsch. vol. xxii. p. 858.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. pp. 29 and 213.
Filicites pteridius.
Schlotheim, Flora d. Vorwelt, p. 59, pl. xiv. fig. 27.
„ Petrefactenkunde, p. 406.
Horizon.—Coal Measures.
Locality.—Foreign. Saxony: Wettin.

Pecopteris integra, Andræ, sp.

Pecopteris integra.
Schimper, Traité d. Paléont. Végét. vol. i. p. 530.
Zeiller, Fougères du Ter. Houil. du Nord de la France, p. 200.
Sphenopteris integra.
Andrae in Germar, Vers. v. Wett. u. Löbejun, p. 67, pl. xxviii.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 63.
Horizon.—Coal Measures.
Locality.—Foreign. Saxony: Wettin (?)

Pecopteris truncata, Rost.

Pecopteris truncata.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Germar, Vers. v. Wett. u. Löbejun, p. 43, pl. xvii.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 70.
Renault, Cours d. Bot. Foss. vol. iii. p. 113.
Rost, De Fil. Ectypis, p. 28.

Alethopteris truncata.
Giebel, Deutschl. Petrefacten, p. 51.

Asterocarpus truncatus.
Giebel, Deutschl. Petrefacten, p. 67.
Schimper, Traité d. Paléont. Végét. vol. i. p. 585.
Unger, Genera et Species, p. 207.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 92.

Asterocarpus Sternbergii.
Brongniart, Dict. Univer. d'Hist. Nat. vol. xiii. p. 76.
Bronn, Index Palæont. p. 121.
Göppert, Syst. Fil. Foss. p. 188, pl. vi. figs. 1–3.
Giebel, Deutschl. Petrefacten, p. 68.
Schimper, Traité d. Paléont. Végét. vol. i. pl. xli. figs. 15, 16.
Unger, Synop. Plant. Foss. p. 41.
„ Genera et Species, p. 206.

Asterotheca Sternbergii.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 77, fig. 19.

Horizon.—Coal Measures.
Locality.—Foreign. Saxony : Wettin.

Pecopteris Beyrichi, Weiss, sp.

Pecopteris Beyrichi.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 497.

Cyatheites Beyrichi.
Lesquereux, Bull. Mus. Comp. Zool. Harvard Col. vol. vii. p. 244, 1882
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 70, pl. viii. fig. 1.

Horizon.—Coal measures.
Locality.—Foreign. Prussia : Saarbrück.

Pecopteris Haidingeri, Ettingshausen, sp.

Sphenopteris Haidingeri.
Ettingshausen, Steinkf. v. Stradonitz, p. 13, pl. ii. figs. 1, 2, pl. iii. fig. 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 282.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia : Stradonitz.

DACTYLOTHECA, Zeiller, 1883.

Ann. des Scienc. Nat. 6e sér. Bot. vol. 16, p. 184.

Dactylotheca plumosa, Artis, sp.

Pecopteris plumosa.
Brongniart, Prodrome, p. 58.
„ Hist. d. Végét. Foss. p. 348, pls. cxxi. cxxii.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 429.
Dawson, Acadian Geol. 2nd Ed. p. 485, 1868.
„ Foss. Plants of Lower Carb. Canada, p. 36, 1873.
Ettingshausen, Steinkf. v. Radnitz, p. 45.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.

Giebel, Deutschl. Petrefacten, p. 58.
Göppert, Foss. Flora d. Perm. Form. p. 124.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 442.
„ Geol. of Pennsyl. vol. ii. part ii. p. 867.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 88, p. xxvii. fig. 4.
Römer, Palaeontographica, vol. ix. p. 34.
Sternberg, Vers. ii. p. 152.
Unger, Synop. Plant. Foss. p. 101.
„ Genera et Species, p. 181.

Cyatheites plumosus.
Bronn, Index Palæont. p. 365.

Senftenbergia plumosa.
Stur, Culm Flora, heft 2, p. 293.

Filicites plumosus.
Artis, Anted. Phytol. p. 17, pl. xvii.

Pecopteris dentata.
Boulay, Ter. Houil. du Nord de la France, p. 32.
Brongniart, Prodome, p. 58.
„ Hist. d. Végét. Foss. p. 346, pls. cxxiii. cxxiv.
? Fontaine & White, Perm. or Upper Carb. Flora, p. 66, pl. xxii. figs. 1–5.
Grand 'Eury, Flore Carb. du Dép. de la Loire, p. 63.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 404.
„ Coal Flora in Pennsyl. p. 240, pl. xliv. fig. 4.
Lindley & Hutton, Fossil Flora, vol. ii. pl. cliv.
Renault, Cours de Botan. Foss. 1883, p. 121, pl. xxi. figs. 4, 5.
Römer, Palaeontographica, vol. ix. p. 33.
Schimper, Traité d. Palćont. Végét. vol. i. p. 508.
Sternberg, Vers. ii. p. 152.
Zeiller, Végét. Foss. du Terr. Houil. p. 86, pl. clxviii. figs. 3, 4.
„ Flore Houil. des Asturies, p. 14.

Cyatheites dentatus.
Bronn, Index Palæont. p. 364.
Feistmantel, Steinkf. v. Kralup in Böhmen, p. 24.
„ Vers. d. Böhm. Kohlenab. p. 294.
Geinitz, Vers. d. Steink. in Sachsen, p. 26, pl. xxv. fig. 11, pl. xxix. figs. 10–12, plate xxx. figs. 1–4.
Giebel, Deutschl. Petrefacten, p. 54.
Göppert, Syst. Fil. Foss. p. 325.
„ Foss. Flora d. Perm. Form. p. 122.
Heer, Flora Foss. Helv. lief 1, p. 31.
Roehl, Foss. Flora d. Steink. Form. Westphalens, p. 78, pl. xxvii. fig. 6.
Unger, Synop. Plant. Foss. p. 88.
„ Genera et Species, p. 158.

Cyathocarpus dentatus.
Weiss, Flora d. jüng. Stk. u. d. Rothl. p. 86.

Senftenbergia dentata.
Stur, Culm Flora, heft 2, p. 293.

Dactylotheca dentata.
Zeiller, Ann. d. Scien. Nat. Bot. 6e sér. vol. xvi. p. 184, pl. ix. figs. 12–15.
„ Bull. Soc. Géol. France, 3e. ser. vol. xii. p. 201.

Pecopteris acuta.
Brogniart, Prodrome, p. 58.
„ Hist. d Végét. Foss. p. 350, pl. cxix. fig. 3.
Bronn, Index Palæont. p. 914.
Dawson, Acadian Geol. 2nd Ed. p. 485, 1868.

Dawson, Foss. Plants of Lower Carb. Canada, p. 37, 1873.
Giebel, Deutschl. Petrefacten, p. 59.
Lesquereux, Coal Flora in Pennsyl. p. 241.
Schimper, Traité d. Paléont. Végét. vol. i. p. 516.
Sternberg, Vers. ii. p. 160.
Unger, Synop. Plant. Foss. p. 102.
„ Genera et Species, p. 184.

Pecopteris delicatula.
Brongniart, Hist. d. Végét. Foss. p. 349, pl. cxvi. fig. 6.
Boulay, Ter. Houil. du Nord de la France, p. 32.
Giebel, Deutschl. Petrefacten, p. 58.
Rost, De Fil. Ectypis, p. 29.
Schimper, Traité d. Paléont. Végét. vol. i. p. 510.
Sternberg, Vers. ii. p. 157.
Unger, Synop. Plant. Foss. p. 101.
„ Genera et Species, p. 181.

Cyatheites delicatulus.
Bronn, Index Palæont. p. 364.

Pecopteris serra.
? Crépin, Bull. Soc. Roy. Bot. Belgique, vol. xx. part ii. p. 25, 1881.
? Lebour, Illustrations of Fossil Plants, p. 47, pl. xxiii.
Lindley & Hutton, Fossil Flora, vol. ii. pl. cvii.
Schimper, Traité d. Paléont. vol. i. p. 504.
Sternberg, Vers. ii. p. 159.

Alethopteris serra.
Bronn, Index Palæont. p. 24.
Giebel, Deutschl. Petrefacten, p. 50.
Göppert, Syst. Fil. Foss. p. 302.
Unger, Synop. Plant. Foss. p. 81.
„ Genera et Species, p. 147.

Pecopteris caudata.
Bronn, Index Palæont. p. 914.
Giebel, Deutschl. Petrefacten, p. 57.
Unger, Synop. Plant. Foss. p. 97.
„ Genera et Species, p. 172.

Sphenopteris caudata.
Lindley & Hutton, Fossil Flora, vol. i. pl. xlviii., vol. ii. pl. cxxxviii.

Aspidites caudatus.
Göppert, Syst. Fil. Foss. p. 363.

Pecopteris Silesiaca.
Bronn, Index Palæont. p. 918.
Giebel, Deutschl. Petrefacten, p. 57.
Lebour, Illustrations of Fossil Plants, pl. xxvi.
Schimper, Traité d Paléont. Végét. vol. i. p. 517.
Unger, Synop. Plant. Foss. p. 97.
„ Genera et Species, p. 173.

Aspidites Silesiacus.
Göppert, Syst. Fil. Foss. p. 364, pl. xxvii. pl. xxxix. fig. 1.

Steffensia Silesiaca.
Sternberg, Vers. ii. p. 122.

Pecopteris Glockeri.
Bronn, Index Palæont. p. 915.
Giebel, Deutschl. Petrefacten, p. 58.

Pecopteris Glockeriana.
Ettingshausen, Steinkf. v. Radnitz, p. 44, pl. xvii. fig. 1.
Unger, Synop. Plant. Foss. p. 98.
„ Genera et Species, p. 175.

Aspidites Glockeri.
Göppert, Syst. Fil. Foss. p. 375, pl. xxix. figs. 1, 2.

Aspidites Glockeri, var. *falciculatus.*
Göppert, Syst. Fil. Foss. p. 375, pl. xxix. figs. 3, 4.

Pecopteris triangularis.
Brongniart, Prodrome, p. 58.

Pecopteris angustifida.
Ettingshausen, Steinkf. v. Radnitz, p. 45, pl. xvi. fig. 1.

Remarks.—*Sphenopteris caudata*, Lindley & Hutton. The types of this species are preserved in the Hutton Collection, Newcastle-on-Tyne, and from their examination I feel quite satisfied as to their identity with *P. plumosa*, Artis, sp. There is really no character by which they can be distinguished—the apparent differences depending entirely on imperfect preservation. In the specimen figured on pl. cxxxviii. of the Fossil Flora, the pinnules are bent back upon each other, which has contributed much to the caudate appearance of the specimen.

Pecopteris serra, Lindley & Hutton—The type specimen of this species is also fortunately preserved in the Hutton Collection. I have examined it, and find it to be only *P. plumosa*, Artis, sp. (= *P. dentata*, Brong.). In regard to this species, the authors of the Fossil Flora make the following remark:* "But a small part of the extensive genus *Pecopteris* is yet published, from all the species of which any figures have been given, this is widely different; but we are uncertain whether it may not be already named by M. Adolphe Brongniart, in his Prodromus." Their plate is dated Jan. 1834.

Pecopteris acuta, Brong.—The characters on which this species is founded seem to be identical with those of the upper portion of the fronds of *P. plumosa*, Artis, sp. (*P. dentata*, Brong.). In *P. dentata*, according to Brongniart, the veins are dichotomous, and in *P. acuta* they are simple; but even in undoubted specimens of *P. dentata* the veins are simple towards the upper portion of the frond, as shown by Brongniart's own figures (pl. cxxiii. fig. 1*a* and 3*a*, and pl. cxxiv. fig. *c*). In one of the figures given by the same author of *P. plumosa*, Artis, sp., the veins are also represented as simple (pl. cxxi. fig. 1*b*), and, in fact, *P. dentata* and *P. plumosa* are generally regarded as different forms of one species. Geinitz has pointed out very fully the relationship of *P. plumosa*, *P. dentata*, and *P. acuta* to each other,† though he does not include *P. acuta* in his list of synonyms; but from an examination of numerous specimens, I cannot discover any character by which these three species can be distinguished from each other.

Pecopteris delicatula, Brongt.—A number of specimens of this plant, from the Forest of Wyre, Lancashire, are in the Collection. The only character by which it is separated from *P. plumosa* is its smaller proportions. The example figured by Geinitz‡ on his pl. xxx. fig. 1, under the name of *Cyatheites dentatus*, is the same form as that to which Brongniart gave the specific distinction of "*delicatula*." Zeiller, in his recent paper on the Ferns of the North of France,§ has also united *P. delicatula* with *P. dentata*. In the specimens from the Forest of Wyre, the veins are sometimes simple, and at other times dichotomous on the same specimen, but the variability

* Vol. ii. p. 72.
† Vers. d. Steinkf. in Sachsen, p. 26.
‡ *Loc. cit.*
§ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 201, 1883.

of this character has already been pointed out. The rachis shows numerous little points from which the scales have fallen.

Aspidites Silesiacus, Göpp., and *Aspidites Glockeri*, Göpp., are also merely forms of *Pecopteris plumosa*, and are here united with that species. Probably *Aspidites oxyphylla* of the same author should also be included here. Most writers mention this plant under the name of *P. dentata*, Brongt., but as this fern is undoubtedly only a form of *P. plumosa*, Artis, sp., this name, as being the older, has priority of claim. The fructification has been described by Zeiller,* who has created for this species the genus *Dactylotheca*, which is here adopted.

Dactylotheca plumosa, in its various forms, is widely distributed in the Coal Measures of Great Britain.

Horizon.—Coal Measures.

Localities.—British. Lancashire: near Manchester. Somersetshire: Camerton; Radstock; High Littleton. Worcestershire: Clee Hills (Presented by H. G. Lyons, Esq.); Forest of Wyre.

Foreign. Bohemia: Radnitz. Silesia: Waldenburg. Spain: Andalusia. United States: Du Quoin, Illinois.

ALETHOPTERIDEÆ.

ALETHOPTERIS, Sternberg, 1820.

Versuch einer geognostisch-botanischen Darstellung der Flora der Vorwelt. I. fasc. iv. p. xxi.

Alethopteris lonchitica, Schlotheim, sp.

Alethopteris lonchitica.

Boulay, Terr. Houil. du Nord de la France, p. 34.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 157.
„ Acadian Geol. 2nd Ed. p. 484, 1868.
„ Canadian Nat. vol. viii. p. 445.
„ Foss. Plants of Lower Carb. Canada, pp. 34 and 38, pl. x. fig. 90.
Etheridge, Catal. of Australian Fossils, p. 29.
Feistmantel, Steinkf. v. Kralup in Böhmen, p. 12.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 12 and 17.
Geinitz, Flora d. Hainich.-Ebersdorfer, pp. 17 and 43, pl. xiv. figs. 1, 2.
„ Neues Jahrbuch, 1867, p. 277.
Giebel, Deutschl. Petrefacten, p. 49.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 15.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 547.
Lesquereux, Coal Flora of Pennsyl. p. 177, pl. xxviii. fig. 7.
Schimper, Traité d. Paléont. Végét. vol. i. p. 554.
Unger, Neues Jahrbuch, 1842, p. 608.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 81.
Zeiller, Végét. Foss. du Terr. Houil. p. 73.
„ Flore Houil. des Asturies, p. 11.
„ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 199.

Alethopteris lonchitidis.

Bronn, Index Palæont. p. 23.
Eichwald, Lethæa Rossica, vol. i. p. 85, pl. ii. fig. 3.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 295 (excl. syn. *A. Serlii*).
Göppert, Syst. Fil. Foss. p. 294.

* Ann. des Scienc. Nat. 6e sér. Bot. vol. xvi. p. 184.

Lebour, Illustrations of Foss. Plants, p. 49, pl. xxiv.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 864.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 72, pl. xiv. figs. 1–4, pl. xxi. fig. 9, pl. xxxi. fig. 4.
Sternberg, Vers. i. fasc. 4, p. xxi., Vers. ii. p. 142.
Unger, Synop. Plant. Foss. p. 79.
„ Genera et Species, p. 144.

Pecopteris lonchitica.
Brongniart, Prodrome, p. 57.
„ Hist. d. Végét. Foss. p. 275, pl. lxxxiv.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cliii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Sauveur, Végét. Foss. de la Belgique, pl. xl. fig. 3, pl. xli., xlii. figs. 4, 5.

Alethopteris heterophylla.
Bronn, Index Palæont. p. 23.
Dawson, Acadian Geol. 2nd Ed. p. 484, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 157.
„ Canadian Nat. vol. viii. p. 445.
Göppert, Syst. Fil. Foss. p. 297.
Roehl, Foss. Flora d. Steink. Form. Westph. p 82, pl. xxxii. figs. 2, 5, 9.
Sternberg, Vers. ii. p. 143.
Unger, Synop. Plant. Foss. p. 79.
„ Genera et Species, p. 145.

Pecopteris heterophylla.
Brongniart, Hist. d. Végét. Foss. p. 281.
Hooker, Mem. Geol. Survey Gt. Brit. vol. ii. pt. 2, p. 400, fig. 1, 1848.
Lindley and Hutton, Foss. Flora, vol. i. pl. xxxviii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.

Alethopteris Mantelli.
Boulay, Terr. Houil. du Nord de la France, p. 34.
Bronn, Index Palæont. p. 23.
Giebel, Deutschl. Petrefacten, p. 50.
Göppert, Syst. Fil. Foss. p. 297.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 74, pl. xiii. fig. 4
Unger, Synop. Plant. Foss. p. 79.
„ Genera et Species, p. 145.
Zeiller, Végét. Foss. du Terr. Houil. p. 74, pl. clxiii. figs. 3, 4.
„ Bull Soc. Géol. France, 3e sér. vol. xii. p. 199.

Pecopteris Mantelli.
Brongniart, Prodrome, p. 57.
„ Hist. d. Végét. Foss. p. 278, pl. lxxxiii. figs. 3, 4.
Dawson, Quart. Journ. Geol. Soc. vol. xv. p. 69, 1859.
Eichwald, Lethæa Rossica, vol. i. p. 88.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cxlv.
Sauveur, Végét. Foss. de la Belgique, pl. xl. figs. 1, 2.
Sternberg, Vers. ii. p. 142.

Alethopteris Sternbergii.
Bronn, Index Palæont. p. 24.
Ettingshausen, Steinkf. v. Radnitz, p. 42, pl. xviii. fig. 4
Göppert, Syst. Fil. Foss. p. 295.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 73.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 79.
„ Genera et Species, p. 144.

Alethopteris urophylla.
Bronn, Index Palæont. p. 24.

Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 16.
Göppert, Syst. Fil. Foss. p. 300.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 864.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 75, pl. xxii. fig. 7.
Römer, Palaeontographica, vol. ix. p. 32, pl. viii. fig. 8, 1862.
Sternberg, Vers. ii. p. 143.
Unger, Synop. Plant. Foss. p. 80.
„ Genera et Species, p. 146.

Pecopteris urophylla.
Brongniart, Hist. d. Végét. Foss. p. 290, pl. lxxxvi.

Alethopteris vulgatior.
Giebel, Deutschl. Petrefacten, p. 49.
Sternberg, Vers. i. fasc. 4, p. xxi. pl. liii. fig. 2, Vers. ii. p. 142.

Alethopteris gracillima.
Boulay, Terr. Houil. du Nord de la France, p. 33, pl. ii. fig. 5.
Crépin, Bull. Soc. Roy. de Botan. de Belgique, vol. xx. pt. 2, p. 25.
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. xii. p. 199.

Pecopteris Rantelli (=? *P. Mantelli.*)
Sauveur, Végét. Foss. de la Belgique, pl. xlii. fig. 1.

Pecopteris multiformis.
Sauveur, Végét. Foss. de la Belgique, pl. xxxvi. fig. 1.

Pecopteris brachyloba,
Sauveur, Végét. Foss. de la Belgique, pl. xxxvi. figs. 2, 3.

Pecopteris rugosa.
Sauveur, Végét. Foss. de la Belgique, pl. xxxvii. fig. 2.

Pecopteris blechnoides.
Brongniart, Prodrome, p. 56.

Alethopteris distans.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 865, pl. xii. fig. 2.

Filicites decurrens.
Artis, Anted. Phytol. pl. xxi.

Filicites lonchiticus.
Schlotheim, Flora d. Vorwelt, p. 55, pl. xi. fig. 22.
„ Petrefactenkunde, p. 411.

Phytolithus filicites.
Martin, Petrificata Derbiensia, pl. x.

Pteris (?) *dubia.*
König, Icones Fossilium Sectiles, pl. xv. fig. 180.
Scheuchzer, Herb. Diluv. pl. i. fig. 4.
Parkinson, Organic Remains, vol. i. pl. iv. figs. 1, 2.

Remarks.—This is one of the commonest and most variable of the Coal Measure plants, and numerous specific names have been applied to the different forms of it, but from *Filicites lonchiticus*, as figured by Schlotheim, to *Alethopteris gracillima*, Boulay, a chain of gradations connects the two extremes.

Horizon.—Coal Measures.

Localities.—British, Derbyshire, near Derby. Durham : Sunderland. Gloucestershire : Forest of Dean. Kilkenny. Lanarkshire : Airdrie. Monmouthshire : Abersuchan. Midlothian : Niddrie. Northumberland : Felling Colliery, near Newcastle-on-Tyne. Shropshire : Coalbrook Dale ; Madeley Court (Presented

by H. Pearce, Esq.). Worcestershire : Forest of Wyre ; Tipton, near Dudley.

Foreign. Africa (South) : Stormberg Mountains. Saxony : Zwickau. Silesia : Waldenburg. Westphalia : Piesberg, near Osnabrück.

Alethopteris Serlii, Brongniart, sp.

Alethopteris Serlii.

Boulay, Terr. Houil. du Nord de la France, p. 34.
Bronn, Index Palæont. p. 34.
Dawson, Acadian Geol. 2nd Ed. p. 484, 1868.
„ Geol. Survey of Canada, Reports, 1874–5, pp. 192 and 196.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 157, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 446.
„ Foss. Plants of Lower Carb. Canada, p. 36.
Feistmantel, O., Steinkf. v. Kralup in Böhmen, p. 12.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 298, 301, 303.
„ K., Der Hangendflötzzug, p. 78.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Geinitz, Flora d. Hainich.-Ebersdorfer. pp. 24 and 44, pl. xiv. figs. 3–5.
Giebel, Deutschl. Petrefacten, p. 50.
Göppert, Syst. Fil. Foss. p. 301, pl. xxi. figs. 6, 7.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 439.
„ Coal Flora of Pennsyl. p. 176, pl. xxix. figs. 1–5.
„ Geol. of Pennsyl. vol. ii. p. 865.
Newberry, Explor. Exped. from Santa Fé, p. 18.
Römer, Palaeontographica, vol. ix. p. 32, pl. viii. fig. 9, 1862.
Schimper, Traité d. Paléont. Végét. vol. i. p. 555.
Sternberg, Vers. ii. p. 144.
Unger, Neues Jahrbuch, 1842, p. 608.
„ Synop. Plant. Foss. p. 80.
„ Genera et Species, p. 146.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.
Zeiller, Végét. Foss. du Terr. Houil. p. 75, pl. clxiii. figs. 1, 2.
„ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 199.

Pecopteris Serlii.

Brongniart, Prodrome, p. 57.
„ Hist. d. Végét. Foss. p. 292, pl. lxxxv.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 434, 1847.
Heer, Flora Foss. Helv. lief. i. p. 32, pl. xii. figs. 8, 9.
Lindley and Hutton, Foss. Flora, vol. iii. pl. cciii.
Stur, Verh. d. k. k. Geol. Reichsanst. pp. 135, 139, and 140, 1884.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 63.

Pecopteris Hannonica.

Sauveur, Végét. Foss. de la Belgique, pl. xxxviii.

Neuropteris oblongata.

Brongniart, Prodrome, p. 54.
„ Hist. d. Végét. Foss. p. 249.
Sternberg, Vers. i. fasc. 4, p. xvii. Vers. ii. p. 75, pl. xxii fig. 1*a*, *b*.

Alethopteris irregularis.

Roehl, Foss. Flora d. Steink. Form. Westph. p. 81, pl. xv figs. 2, 14, 15.
Parkinson, Organic Remains, vol. i. pl. iv. fig. 6.

Horizon.—Coal Measures.

Localities.—British. Gloucestershire : Forest of Dean. Somersetshire : Radstock. Worcestershire : Forest of Wyre.
Foreign. France : Rouchamp, Haut-Saône ; Mines of La Croizet, St. Etienne (Presented by M. C. Chantre). Russia, near Kosloo, Black Sea (Presented by Captain Spratt, R.N.). (?) Spain : Andalucia. United States : Mazon Creek, Grundy Co., Illinois.

Alethopteris gigas, Gutbier, sp.

Alethopteris gigas.
Fontaine and White, Perm. or Upper Carb. Flora, p. 89, pl. xxxiii. figs. 5, 6.
Geinitz, Leitpflanzen d. Rothl. p. 12, pl. i. fig. 1.
„ Dyas, p. 141.
Schimper, Traité d. Paléont Végét, vol. i. p. 557.

Pecopteris gigas.
Gutbier, Vers. d. Rothl. in Sachsen, p. 14, pl. vi. figs. 1, 2, 3 (? pl. ix. fig. 7).

Callipteridium gigas.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 109.
Renault, Cours d. Botan. Foss. 1883, p. 155.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xxii. p. 864.

Horizon.—Coal Measures.
Locality.—Foreign. France : Mines of La Croizet, St. Etienne (Presented by M. C. Chantre).

Alethopteris aquilina, Schlotheim, sp.

Alethopteris aquilina.
Andrae, Jahrb. d. Naturw. Vereines, Halle, 1850, p. 127.
Bronn, Index Palæont. p. 22.
„ Lethæa Geog. vol. i. pt. 2, p. 118, pl. vii. fig. 3.
Eichwald, Lethæa Rossica, vol. i. p. 86.
„ Urwelt Russlands, heft i. p. 87.
Feistmantel, O., Fruchts. Foss. Pflanzen aus d. Böhm. Steink. p. 49.
„ Steinkf. v. Kralup in Böhmen, p. 12.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 295.
„ K., Der Hangendflötzzug, p. 79.
Fontaine and White, Perm. or Upper Carb. Flora, p. 20.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 27 (excl. pl. xxxi. figs. 5–7).
Giebel, Deutschl. Petrefacten, p. 50.
Göppert, Syst. Fil. Foss. p. 298.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 108.
Lesquereux, Coal Flora of Pennsyl. p. 181.
„ Geol. of Pennsyl. vol. ii. p. 864.
„ Report, Geol. Survey of Illinois, vol. ii. p. 438.
Renault, Cours d. Botan. Foss. 1883, p. 158, pl. xxvii. figs. 1, 2, 10–12.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 74.
Rost, De Fil. Ectypis, p. 26.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarz. p. 4.
Sternberg, Vers. ii. p. 143.
Unger, Synop. Plant. Foss. p. 80.
„ Genera et Species, p. 145.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.

Pecopteris aquilina.
Brongniart, Prodrome, p. 56.
„ Hist. d. Végét. Foss. p. 284, pl. xc.
Gutbier, Vers. d. Zwick. Schwarzk. p. 78.
Sternberg, Vers. i. fasc. 4, p. xx.

Asterocarpus aquilinus.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 90.

Scolecopteris aquilina.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 122.

Filicites aquilinus.
Schlotheim, Flora d. Vorwelt, p. 38, pl. iv. fig. 7, pl. v. fig. 8.
„ Petrefactenkunde, p. 405.

Pecopteris affinis.
Sternberg, Vers. i. fasc. 4, p. xx.

Pecopteris Schlotheimii.
Brongniart, Prodrome, p. 57.

Remarks.—The fossil figured as *Alethopteris aquilina*, Geinitz (Vers. d. Steinkf. in Sachsen, pl. xxxi. figs. 5–7), does not belong to this species, but to *Pecopteris Miltoni*, Artis, sp.
Horizon.—Coal Measures.
Locality.—Foreign. Bohemia.

Alethopteris Sullivantii, Lesquereux, sp.

Alethopteris Sullivantii.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Schimper, Traité d. Paléont. Végét. vol. i. p. 561.

Callipteridium Sullivantii.
Lesquereux, Coal Flora in Pennsyl. p. 164.

Callipteris Sullivantii.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 440, pl. xxxviii. fig. 1.
„ Geol. of Pennsyl. vol. ii. p. 866, pl. v. fig. 13.
White, State of Indiana, 2nd Ann. Rept. Dept. of Statistics and Geol. p. 521, pl. ix. fig. 4, 1880.

Horizon.—Coal Measures.
Locality.—Foreign. United States: Colchester, Illinois.

Alethopteris longifolia, Presl, sp.

Alethopteris longifolia.
Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 29, pl. xxxi. figs. 8, 9.
Göppert, Syst. Fil. Foss. p. 308.
Unger, Synop. Plant. Foss. p. 83.
„ Genera et Species, p. 150.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.

Pecopteris longifolia.
Crépin, Bull. Acad. Roy. Belgique, 2e sér. vol. xxxviii. p. 10, pl. ii. figs. 4–6, 1874.
Sternberg (Presl), Vers. ii. p. 155, pl. xxxvi. fig. 1.

Asplenites longifolius.
Ettingshausen, Steinkf. v. Radnitz, p. 40, pl. xvi. figs. 2–4.

? Asplenites alethopteroides.
Ettingshausen, Steinkf. v. Radnitz, p. 41, pl. xix. figs. 4, 5.

Remarks.—*Asplenites alethopteroides*, Ett., is probably not specifically distinct from *Alethopteris longifolia*. I cannot see in Ettinghausen's figures of these two species the distinguishing character of the venation, as mentioned in his descriptions.

Horizon.—Coal Measures.

Locality.—*Foreign.* Bohemia: Radnitz.

Alethopteris erosa, Gutbier, sp.

Alethopteris erosa.

Feistmantel, Fruchts. Foss. Pflanzen aus d. Böhm. Steink. p. 50.
" Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 598.
" Vers. d. Böhm. Kohlenab. p. 295 (excl. syn. *A. Sternbergii*, Ett.).
" Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 29, pl. xxxii. figs. 7, 8.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 394.
" Coal Flora of Pennsyl. p. 255, pl. xliv. figs. 1–3.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 81 (fig. bad).
Schimper, Traité d. Paléont. Végét. vol. iii. p. 501.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.
Zeiller, Ann. d. Sc. Nat. Bot. 6e sér vol. xvii., p. 8, 1884.

Pecopteris erosa.

Bronn, Index Palæont. p. 915.
Geinitz, Gaea v. Sachsen, p. 81.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 63.
Lesquereux, Coal Flora of Pennsyl. p. 255, pl. xliv. figs. 1 and 3.

Pecopteris linearis.

Geinitz, Gaea v. Sachsen, p. 83.

Oligocarpia erosa.

Stur, Culm Flora, heft ii. p. 294.

Saccopteris erosa.

Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 68.

Remarks.—The specimen from Titterstone Clee, Shropshire, is a little indistinct, but I think is referable to this species.

Horizon.—Coal Measures.

Localities.—*British.* Shropshire: Knowlbury Coal Basin, Titterstone Clee (Presented by the Rev. Burleigh James).
Foreign. Saxony: Zwickau.

Alethopteris Sternbergii, Ettingshausen, sp.

Pecopteris Sternbergii.

Boulay, Terr. Houil. du Nord de la France, p. 33, pl. ii. fig. 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 525.

Asplenites Sternbergii.

Ettingshausen, Steinkf. v. Radnitz, p. 42, pl. xx. figs. 2, 3, and fig. 4 (pars.).
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.

Remarks.—The example I have identified as Ettinghausen's plant is not well preserved, but I feel confident that it is his species. Feistmantel unites *Alethopteris Sternbergii* with *Alethopteris erosa*. (Vers. d. Böhm. Kohlenab. p. 295).

Horizon.—Coal Measures.

Locality.—*British.* Durham: Howden, near Bishop Auckland.

LONCHOPTERIS, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 59.

Lonchopteris Bricii, Brongniart.

Lonchopteris Bricii.
Brongniart, Prodrome, p. 60.
„ Hist. d. Végét. Foss. p. 368, pl. cxxxi. figs. 2, 3.
Bronn, Index Palæont. p. 667.
Göppert, Gatt. d. Foss. Pflanzen, lief. v., vi. p. 117, pl. xvii. figs. 1, 2.
Renault, Cours d. Botan. Foss. 1883, p. 166.
Sternberg, Vers. ii. p. 167.
Zeiller, Végét. Foss. du Terr. Houil. p. 79 (excl. syn. and figure).
„ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 199.

Lonchopteris Roehlii.
Andrae, Vorwelt. Pflanzen, p. 5, pl. i., ii. figs. 2, 3, 1865.
Boulay, Terr. Houil. du Nord de la France, p. 36.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 69, pl. xii. fig. 2, and pl. xix.
Schimper, Traité d. Paléont. Végét. vol. i. p. 621.

Woodwardites (?) Robertsi.
Morris, Quart. Journ. Geol. Soc. vol. xv. p. 82, figs. 1, 2, 1859.

Remarks.—Most writers on Fossil Botany have united *Lonchopteris Bricii*, Brongt., with *Lonchopteris rugosa*, Brongt. Brongniart's figures of these two ferns favour this view; but Zeiller, who has carefully examined the types, finds *Lonchopteris Bricii*, Brongt., and *Lonchopteris rugosa*, Brongt., to be distinct species, and that Andrae's *Lonchopteris Roehli* is Brongniart's *L. Bricii*.*

The fern described as *Lonchopteris Roehli*, by Andrae in 1865, is evidently similar to that described by Morris in 1859 as *Lonchopteris* (*Woodwardites*) *Robertsi*. As Andrae does not refer to Morris's plant, possibly he was not aware of its existence. Professor Morris, in his description of *Lonchopteris Robertsi*, mentions that the pinnules are without a midrib, but he has probably been misled in this point through the imperfect preservation of his specimens, as the presence of a midrib is shown in some fragments in the Collection, evidently belonging to his species. These fragments are from the same neighbourhood as that from which Prof. Morris's *Woodwardites (?) Robertsi* was collected. *Lonchopteris Bricii* being the oldest name for this fern, it is adopted here.

Horizon.—Coal Measures.

Locality.—*British.* Worcestershire: Forest of Wyre.

Lonchopteris rugosa, Brongniart.

Lonchopteris rugosa.
Andrae, Vorwelt. Pflanzen, p. 9, pl. iii. figs. 2, 3.
„ Neues Jahrbuch, 1864, p. 171.
Boulay, Terr. Houil. du Nord de la France, p. 35.
Brongniart, Prodrome, p. 60.
„ Hist. d. Végét. Foss. p. 368, pl. cxxxi. fig. 1.
Bronn, Index Palæont. p. 668.
Feistmantel, Steinkf. u. Perm-Ablager. p. 87.
„ Vers. d. Böhm. Kohlenab. p. 296, pl. lxvii. figs. 7, 8.
Schimper, Traité d. Paléont. Végét. vol. i. p. 621.
Sternberg, Vers. ii. p. 167.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 68, pl. xvi. fig. 4, pl. xxix. figs. 1–7.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 99.

* Bull. Soc. Geol. France, 3e ser. vol. xii. p. 199.

Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. xii. p. 199.

? Woodwardites obtusilobus.
Bronn, Index Palæont. p. 1374.
Giebel, Deutschl. Petrefacten, p. 49.
Göppert, Syst. Fil. Foss. p. 289, pl. xxi. fig. 1.
Unger, Synop. Plant. Foss. p. 77.
„ Genera et Species, p. 142.

Woodwardites acutilobus.
Bronn, Index Palæont. p. 1374.
Giebel, Deutschl. Petrefacten, p. 49.
Göppert, Syst. Fil. Foss. p. 289, pl. xxi. fig. 2.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 77.
„ Genera et Species, p. 142.

Lonchopteris Dournaisii.
Brongniart, Prodrome, p. 171.

Lonchopteris Goppertiana.
Sternberg (Presl), Vers. ii. p. 166.

Sagenopteris obtusiloba.
Sternberg (Presl), Vers. ii. p. 166.

Remarks.—From the figure and description of *Woodwardites obtusilobus* it is difficult to decide whether it belongs to *Lonchopteris Bricii*, Brongt., or to this species. The meshes formed by the veins, as shown in Göppert's enlarged drawing, appear rather larger than they usually are in *Lonchopteris rugosa.*

Horizon.—Coal Measures.
Locality.—British. Gloucestershire : Forest of Dean.
Foreign.—Bohemia : Stradonitz.

FILICINÆ INCERTÆ SEDIS.

RHACOPHYLLUM, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 684.

Rhacophyllum crispum, Gutbier, sp.

Aphlebia crispa.
Bronn, Index Palæont. p. 85.
Sternberg (Presl), Vers. ii. p. 112.
Unger, Synop. Plant. Foss. p. 106.
Zeiller, Végét. Foss. du Terr. Houil. p. 95.
„ Bull. Soc. Géol. France, 3e sér. vol. xii. p. 202.

Fucoides crispus.
Gutbier, Vers. d. Zwick. Schwarzk. p. 13, pl. i. fig. 11, pl. vi. fig. 18.

Rhacophyllum lactuca.
Boulay, Terr. Houil. du Nord de la France, p. 36.
Fontaine and White, Perm. or Upper Carb. Flora, p. 94.
Lesquereux, Coal Flora of Pennsyl. p. 315.
Schimper, Traité d. Paléont. Végét. vol. i. p. 684, pl. xlvi. fig. 1, pl. xlvii. fig. 2, and vol. iii. p. 524.

Schizopteris lactuca.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 126.
Bronn, Index Palæont. p. 1122.

Ettingshausen, Steinkf. v. Radnitz, p. 35.
Feistmantel, Steinkf. v. Kralup in Böhm. pp. 11 and 22.
„ Steinkohl u. Perm-Ablager. p. 76.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 19, pl. xxvi. fig. 1.
„ Gaea v. Sachsen, p. 73.
Germar, Vers. v. Wettin u. Löbejun, p. 45, pls. xviii., xix.
Giebel (*in part*), Deutschl. Petrefacten, p. 38.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 199.
Renault, Cours d. Botan. Foss. 1883, p. 103.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarzk. pp. 2 and 5.
Sternberg (Presl), Vers. ii. p. 112.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 142.
Unger, Genera et Species, p. 105.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 79.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 59.

Hymenophyllites lactuca.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 415.

Pachyphyllum lactuca.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 863, pl. viii. figs. 4, 5.

Aphlebia acuta.
Sternberg, Vers. ii. p. 112.
Unger, Synop. Plant. Foss. p. 105.

Fucoides acutus.
Germar and Kaulfuss, Verh. d. k. Leop. Carol. Akad. vol. xv. part ii. p. 230, pl. lxvi. fig. 7.

Aphlebia linearis.
Bronn, Index Palæont. p. 85.
Geinitz, Gaea v. Sachsen, p. 73.
Sternberg (Presl), Vers. ii. p. 113.
Unger, Synop. Plant. Foss. p. 106.
„ Genera et Species, p. 190.

Fucoides linearis.
Gutbier, Vers. d. Zwick. Schwarzk. p. 13, pl. i. figs. 10 and 12.

Filicites lacidiformis.
? Germar, Isis, 1837, p. 430, pl. ii. fig. 4.
Rost, De Fil. Ectypis, p. 20.

Hymenophyllites Clarkii.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 438, pl. xxxix. fig. 7, vol. iv. p. 416, pl. xvi. figs. 1, 2.

Remarks.—*Schizopteris lactuca*, Roehl (Foss. Flora d. Steink. Form Westph. p. 47, pl. xviii.), is not, according to Schimper, this species, and has been named by him *Rhacophyllum speciosissimum.* (Traité d. Paléont. Végét. vol. i. p. 685.)
Horizon.—Coal Measures.
Localities.—*British.* Shropshire : Madeley Court (Presented by H. Pearce, Esq.).
Foreign. Saxony : Zwickau.

Rhacophyllum filiciforme, Gutbier, sp.

Rhacophyllum filiciforme.
Lesquereux, Coal Flora of Pennsyl. p. 316.
Renault, Cours d. Botan. Foss. 1883, p. 106, pl. xv. fig. 5.
Schimper, Traité d. Paléont. Végét. vol. i. p. 685, pl. xlviii. figs. 3–6.

Schizopteris filiciformis.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 48.
Römer, Palaeontographica, vol. ix. p. 25, 1862.

Fucoides filiciformis.
Gutbier, Vers. d. Zwick. Schwarzk. p. 11, pl. i. figs. 3, 6, 7, 8, 13 (excl. syn.).

Aphlebia crenata.
Bronn, Index Palæont. p. 85.
Sternberg (Presl), Vers. ii. p. 112.
Unger, Synop. Plant. Foss. p. 106.

Fucoides crenatus.
Gutbier, Vers. d. Zwick. Schwarzk. p. 14, pl. i. fig. 14.

Palmacites caryotoides.
Bronn, Index Palæont. p. 898.
Ettingshausen, Steinkf. v. Stradonitz, p. 17, pl. i. fig. 3.
Sternberg, Vers. i. p. 35, pl. xlviii. fig. 2.
Unger, Genera et Species, p. 340.

Noeggerathia caryotoides.
Ettingshausen, Steinkf. v. Radnitz, p. 59.

Schizopteris Gutbieriana.
Feistmantel, Steinkohl. u. Perm-Ablager. p. 77.
„ Steinkf. v. Kralup. in Böhm. pp. 11 and 22.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 597.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 293 and 295.
Geinitz, Vers. d. Steinf. in Sachsen, p. 19, pl. xxv. figs. 11–14.
Römer, Palaeontographica, vol. ix. p. 25, 1862.

Hymenophyllites Gutberianus.
Unger, Genera et Species, p. 132.

Trichomanites Gutbierianus.
Bronn, Index Palæont. p. 1278.

Rhodea Gutbieriana.
Sternberg, Vers. ii. p. 111.

Horizon.—Coal Measures.
Locality.—Foreign. Saxony: Zwickau.

SPIROPTERIS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 688.

Spiropteris, sp.

Remarks.—I include here two specimens of circinately coiled ferns. That from Ebbw Vale belongs to the genus *Neuropteris*, and from its being associated with some scattered pinnules of *Neuropteris gigantea*, it probably belongs to that species.

The other example bears no locality, and does not appear to be British. It is possibly referable to *Spiropteris* (*Selaginites*) *Erdmanni*, Germar, sp. (Vers. d. Wett. u. Löbejun, p. 61, pl. xxvi.; Schimper, Traité d. Paléont. Végét. vol. i. p. 689, pl. xlix.)

Horizon.—Coal Measures.
Localities.—British. South Wales: Ebbw Vale, near Merthyr Tydvil.

FERN STEMS.

MEGAPHYTON, Artis, 1825.

Antediluvian Phytology, p. 20.

Megaphyton frondosum, Artis.

Megaphyton frondosum.
Artis, Anted. Phytol. pl. xx.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 32, pl. xxxv. fig. 10.

Megaphyton approximatum.
Bronn, Index Palæont. p. 710.
Goldenberg, Flora Saræp. Foss. heft i. p. 19.
Göppert, Syst. Fil. Foss. p. 433.
Lindley and Hutton, Foss. Flora, vol. ii. p. 93, pl. cxvi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489, 1840.
Schimper, Traité d. Paléont. Végét. vol. i. p. 713.
Sternberg, Vers. ii. p. 187.
Unger, Synop. Plant. Foss. p. 136.
„ Genera et Species, p. 264.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.

Megaphyton distans.
Bronn, Index Palæont. p. 710.
Goldenberg, Flora Saræp. Foss. heft i. p. 19.
Göppert, Syst. Fil. Foss. p. 433.
Lindley and Hutton, Foss. Flora, vol. ii. p. 95, pl. cxvii.
Schimper, Traité d. Paléont. Végét. vol. i. p. 713.
Sternberg, Vers. ii. p. 187, pl. xlvi. fig. 2.
Unger, Synop Plant. Foss. p. 136.
„ Genera et Species, p. 264.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.

? Megaphyton magnificum.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 159, pl. viii. fig. 34.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 527.

Megaphyton Goldenbergi.
Feistmantel, Ueber Baumfarrenreste d. Böhm. Steink. p. 7, pl. i. fig. 1.
„ Vers. d. Böhm. Kohlenab. p 142, pl. xxii. fig. 1.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
Lesquereux, Coal Flora of Pennsyl. p. 349, pl. lxi. fig. 4.
Schimper, Traité d. Paléont. Végét. vol. i. p. 713, pl. liv.
Weiss, Zeitsch. d. Deut. Geol. Gesell. vol. xii. p. 510 (fig.), 1860.
„ Verhandl. d. Natur. Vereines d. Preuss. Rhein. u. Westph. 1868, p. 83.

Megaphytum majus.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 140, pl. xx. fig. 1.

Megaphytum giganteum.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 141, pl. xx. figs. 2, 3, and pl. xxi.

Megaphyton M'Layi (*or M. Goldenbergii*).
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 83.

Remarks.—I have adopted for these fossils the specific name originally applied to them by Artis, as the alteration of *Megaphyton frondosum* to *Megaphyton distans* on the grounds proposed by Lindley and Hutton is not admissible. *Megaphyton approximatum*, L. and H., is only a better-pre-

served example of *Megaphyton frondosum*, and should be united with that plant. This fern stem attained considerable size.

The Museum of the Geological Society of London possesses a specimen presented to that society by Wm. Hutton, Esq., which, though the full dimensions of the stem are not shown, measures 19 inches in length and 8 inches in width. The scars, which stand about an inch apart, are nearly 3 inches wide. This, I believe, is the form which has been named *Megaphyton magnificum* by Dawson, but which does not differ from *Megaphyton frondosum*, except in being larger and the scars better preserved than on the type of the latter species, the counterpart of which is in the Collection.

Some fine specimens of *Megaphyton* are in the Natural History Museum, Newcastle-on-Tyne. One of these shows on the upper end of the fossil well-preserved scars, apparently representing the *Megaphyton Goldenbergi*, Weiss; at the other end the less well-preserved scars represent *Megaphyton approximatum*, L. and H., or *Megaphyton frondosum*, Artis. These three species are, I believe, merely different ages and states of preservation of the same plant.

Feistmantel figures in his Vers. d. Böhm. Kohlenab. some specimens of *Megaphyton*. Of these he names those on pl. xx. figs. 2, 3, and pl. xxi. *Megaphyton giganteum*, and that on pl. xx. fig. 1, *Megaphyton majus*. All these examples are apparently only old, and not very well-preserved specimens of *Megaphyton frondosum*, Artis.

Whatever Sternberg's *Megaphyton giganteum* (Vers. ii. p. 187, pl. xlvi.) may be, whether really a *Megaphyton* or a decorticated *Ulodendron*, is a point very difficult or impossible to decide, but I think Feistmantel's *Megaphyton giganteum* should be referred as above. It must be noted, however, in regard to Feistmantel's figures of *Megaphyton giganteum*, that Zeiller thinks them similar to the specimen he has named *Megaphyton Souichi* (Végét. Foss. du Terr. Houil. p. 103, pl. clxx. fig. 3). I fear this last-mentioned species is founded on an imperfectly preserved specimen, one not showing clearly the original form of the leaf-scar, and being very much in the same state of preservation as Artis's type of *Megaphyton frondosum*, which is proved by many transitional specimens, and transitions in the form and preservation of the frond scars on the same fossil, to be similar to *Megaphyton approximatum*, L. and H. But though not prepared to say that *Megaphyton Souichi*, Zeiller, belongs to *Megaphyton frondosum*, Artis, still I feel little doubt in referring Feistmantel's figures to the last-mentioned species.

It is evident that with the age of the plant the form of the leaf-scar would alter more or less, and that the scars on the lower part of the stem, even when the plant was in life, would through natural causes gradually lose the sharpness of the contour possessed by those situated higher up the stem, and from which the fronds had only recently fallen. Such modifications occur in the frond scars on the stems of recent tree ferns, and we have every reason to believe that their fossil representatives participated in the same changes. When we couple with this the different appearances imparted during fossilisation, and partial decay probably taking place in some cases before the stems were finally imbedded in what now forms their matrix, it is evident that great care is necessary in the discrimination of such species, though at the same time care must be taken not to ignore real specific differences.

Horizon.—Coal Measures.

Locality.—British. Yorkshire : Rowmarsh (counterpart of type).

CAULOPTERIS, Lindley and Hutton, 1832.

Fossil Flora of Great Britain, vol. i. p. 121.

Caulopteris peltigera, Brongniart, sp.

Caulopteris peltigera.

Bronn, Index Palæont. p. 252.

Feistmantel, O., Ueber Baumfarrenreste d. Böhm. Steink. p. 13, pl. ii. fig. 2.

Feistmantel, O., Steinkohl. u. Perm.-Ablager. p. 88.
„ Vers. d. Böhm. Kohlenab. p. 147, pl. xxiv.
„ K., Der Hangendflötzzug, p. 82, pl. iii. fig. 1.
Geinitz, Vers. d. Steinkf. v. Sachsen, p. 31, pl. xxxiv. fig. 3.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 85, pl. ix. fig. 2.
Sternberg, Vers. ii. p. 172.
Unger, Synop. Plant. Foss. p. 109.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868 p. 83.
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. iii. p. 574, pl. xvii. fig. 3.
„ Végét. Foss. du Terr. Houil. p. 99.

Sigillaria peltigera.
Brongniart, Prodrome, p. 64.
„ Hist. d. Végét. Foss. p. 417, pl. cxxxviii.
Geinitz, Gaea v. Sachsen, p. 86.

Stemmatopteris peltigera.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 125.
Corda, Flora d. Vorwelt, p. 76.
Germar, Vers. v. Wettin. u. Löbejun, p. 116, pl. xl. fig. 3.
Giebel, Deutschl. Petrefacten, p. 64.
Schimper, Traité d. Paléont. Végét. vol. i. p. 710, pl. liii. figs. 1, 2.
Unger, Genera et Species, p. 196.

Caulopteris Phillipsii.
Brongniart, Dictionnaire Universel, vol. xiii. p. 84.
Bronn, Index Palæont. p. 252.
Corda, Flora d. Vorwelt, p. 76.
Feistmantel, Uber Baumfarrenreste d. Böhm. Steink. p. 13.
„ Vers. d. Böhm. Kohlenablag. p. 146, pl. xxv. fig. 1.
Göppert, Syst. Fil. Foss. p. 451.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cxl.
Renault, Cours d. Botan. Foss. 1883, p. 72.
Schimper, Traité d. Paléont. Végét. vol. i. p. 707.
Sternberg, Vers. ii. p. 172.
Unger, Synop. Plant. Foss. p. 110.
„ Genera et Species, p. 197.

Caulopteris macrodiscus.
Bronn, Index Paléont, p. 252.
Feistmantel, Der Hangendflötzzug, p. 85, pl. iv
Fischer, Bull. Soc. Imp. Nat. Moscou, p. 491, 1840.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 31, pl. xxxv. figs. 4, 5.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 91, pl. xxvii. fig. 5.
Schimper, Traité d. Paléont. Végét. vol. i. p. 707, pl. liii. fig. 3.
Sternberg, Vers. ii. p. 172.
Unger, Synop. Plant. Foss. p. 110.
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. iii. p. 576.

Ptychopteris macrodiscus.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 125.
Corda, Flora d. Vorwelt, p. 76.
Germar, Vers. v. Wettin. Löbejun, p. 115, pl. xl. fig. 1.
Giebel, Deutschl. Petrefacten, p. 65.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 88.
Renault, Cours d. Botan. Foss. 1883, p. 139.
Unger, Genera et Species, p. 197.
Zeiller, Végét. Foss. du Terr. Houil. p. 102, pl. clxx. fig. 2.

Ptychopteris obliqua.
Germar, Vers. v. Wettin. u. Löbejun, p. 115, pl. xl. fig. 2.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 89, pl. x. fig. 2

Sigillaria macrodiscus.
Brongniart, Hist. d. Végét. Foss. p. 418, pl. cxxxix.
Geinitz, Gaea v. Sachsen, p. 86.

Caulopteris Giffordi.
Lesquereux, Coal. Flora of Pennsyl. p. 343, pl. lx. figs. 1, 2.

? Lepidodendron radicans.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 454, pl. xlvi. fig. 1.
„ Coal Flora of Pennsyl. p. 397.

Remarks.—Zeiller has given a figure of *Caulopteris peltigera*,* showing the two genera *Ptychopteris* (*Stemmatopteris*) and *Caulopteris* united on one specimen. This example raised the question with him whether *Caulopteris peltigera* and *Caulopteris macrodiscus* should not be united, but he decided to keep them distinct and await further evidence.

Although it was eventually discovered that the example with which he was dealing did not belong to *Caulopteris peltigera*, still it proved the identity of those stems comprised in the genus *Ptychopteris* (*Stemmatopteris*) with *Caulopteris* as restricted by some authors. Or in other words, the *Caulopteris* of the *Caulopteris macrodiscus* type are merely the inner surface of the stem of the *Caulopteris* of the *Caulopteris peltigera* type. This view is now adopted by Zeiller,† and judging from his figure of *Caulopteris patria*, it appears to be the only one that can be accepted.

I have united with *Caulopteris peltigera*, Brongt., sp., *Caulopteris macrodiscus*, Brongt., sp., as a specimen of the former from Radstock in the Collection of Mr. J. McMurtrie, F.G.S., shows, where part of the outer surface has been removed, that the inner layer forms the *Caulopteris macrodiscus*, Brongniart.

Caulopteris Phillipsii, L. and H., does not in any way differ from *Caulopteris macrodiscus*, Brongniart, sp. I have seen many specimens of this last-mentioned species from the Radstock Coal Field, the same district as that from which *Caulopteris Phillipsii* was collected, and have entirely failed to discover a character by which any of the specimens usually referred to *Caulopteris Phillipsii*, L. and H., can be distinguished from Brongniart's plant. From this circumstance, and the fact that Lindley and Hutton's figure does not in itself show any character by which it is distinguishable from *Caulopteris macrodiscus*, *Caulopteris Phillipsii* is also included here as a synonym for *Caulopteris peltigera*. The plate of *Caulopteris Phillipsii*, L. and H., in the Fossil Flora was taken from a plaster cast, the original of which seems to have been indifferently preserved.

Feistmantel is of opinion that *Caulopteris Phillipsii* is related to *Caulopteris macrodiscus*. He says: "It appears to me that this species (*Caulopteris Phillipsii*) is pretty closely related to *Caulopteris macrodiscus*,"‡ and again: "According to my view this species is probably related to *Caulopteris macrodiscus*."§

Roehl's figure of *Caulopteris macrodiscus* shows towards the upper portion of the leaf-scar four longitudinal tracts arranged in a transverse row. I have not observed a similar structure, nor is it shown on any of the other figures of the species with which I am acquainted.

Otherwise than being slightly larger than most of the specimens of *Caulopteris macrodiscus*, Brongt., sp., a character which only appears to represent an older stem, I do not see how *Caulopteris Giffordi*, Lesquereux,

* Bull. Soc. Géol. France, 3e sér. vol. iii. p. 576, pl. xvii. fig. 4. This is named on the plate *Caulopteris peltigera*, Brong., ? but has since been described as a new species by Grand 'Eury under the name of *Caulopteris patria*. [See Zeiller, Végét. Foss. du Terr. Houil. p. 100; also Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 87.]

† Bull. Soc. Géol. France, 3e sér. vol. xii. p. 203.

‡ Baumfarrenreste. p. 13.

§ Vers. d. Böhm. Kohlenab. p. 147.

is to be separated from Brongniart's plant, which in turn, as above stated, appears only to represent an inner surface of the stem of *Caulopteris peltigera*, Brongt., sp.

Lepidodendron radicans, Lesqx., seems to be referrable to *Caulopteris*, and perhaps to *Caulopteris peltigera*.

Horizon.—Coal Measures.
Locality.—British. Northumberland : Newcastle-on-Tyne.

Caulopteris Cistii, Brongniart, sp.

Caulopteris Cistii.
Bronn, Index Palæont. p. 252.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 146.
„ Uber Baumfarrenreste d. Böhm. Steink. p. 13.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 31, pl. xxxiv. figs. 1, 2.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 86.
Lesquereux, Coal Flora of Pennsyl. p. 345.
„ Geol. of Pennsyl. vol. ii. p. 869.
Sternberg, Vers. ii. p. 172.
Unger, Synop. Plant. Foss. p. 110.

Stemmatopteris Cistii.
Corda, Flora d. Vorwelt, p. 76.
Schimper, Traité d. Paléont. Végét. vol. i. p. 710.
Unger, Genera et Species, p. 196.

Sigillaria Cistii.
Brongniart, Prodrome, p. 64.
„ Hist. d. Végét. Foss. p. 418, pl. cxl. fig. 2.

Remarks.—Geinitz refers to transition specimens between this species and *Caulopteris macrodiscus*, Brongt., sp.*=(*Caulopteris peltigera*).
Horizon.—Coal Measures.
Locality.—British. Somerset : Radstock.

Rachis of Ferns.

Noeggerathia tenuistriata.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 219, pl. xli. fig. 8.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 157, pl. xxvi. figs. 1–4.

Noeggerathia dichotoma.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 219, pl. xli. figs. 6, 7.

Remarks.—The rachis of fossil ferns have several times been described as *Noeggerathia*. They are usually longitudinally striated, but the striæ are seldom constant in thickness or run continuously for any distance, and in these respects they essentially differ from those of *Cordaites* (*Noeggerathia*). When the specimens are of a moderate size they invariably give off lateral branches—the rachis of the pinnæ of the frond—and occasionally they bear many small transverse shallow pits; these are probably the scars left by fallen scales.

The large dimensions to which the fronds of some of the Carboniferous Ferns attained is indicated by the size of these specimens. A portion of a large rachis in the Collection measures in its compressed state 4 inches across. The fragment is only 9 inches long, but gives off two secondary branches each fully an inch wide. Another specimen from Carluke has a rachis 3½ inches wide. On the impression left in the matrix, where the carbonaceous matter has been removed, are shown the little transversely elongated pits from which the scales have fallen, and which appear to be without any definite order.

* Vers. d. Steinkf. in Sachsen, p. 31.

Horizon.—Coal Measures.
Localities.—British. Lanarkshire : Carluke (Presented by the British Association). Northumberland : Newcastle-on-Tyne.
Foreign.—Saxony : Zwickau.

LYCOPODIACEÆ.

LEPIDODENDRON, Sternberg, 1820.

Versuch eines geognostisch-botanischen Darstellung der Flora der Vorwelt i. fasc. i. p. 25, and fasc. iv. p. 10.

Lepidodendron Sternbergii, Brongniart.

Lepidodendron Sternbergii.
Boulay, Terr. Houil. du Nord de la France, p. 36.
Brongniart, Prodrome, p. 85.
Dawson, Geol. Survey of Canada, Reports, 1874–5, p. 192.
„ Foss. Plants Lower Carb. Canada, pp. 22 and 37, pl. vi. figs. 42–45.
Ettingshausen, Jahrb. d. k. k. Geol. Reichsanst. vol. iv. p. 435.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 140.
Heer, Flora Foss. Helv. lief. i. p. 36, pl. xvi. fig. 8, pl. xviii. fig. 5.
Lesquereux, Coal Flora of Pennsyl. p. 366 (excl. syn. *L. selaginoides*, L. and H.).
Lindley and Hutton, Foss. Flora, vol. i. pl. iv., vol. ii. pl. cxii., vol. iii. pl. cciii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Portlock, Geol. Report of Londonderry, p. 627.
Renault, Cours d. Botan. Foss. 1882, p. 14.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 127, pl. viii. fig. 8*a*.
Sauveur, Végét. Foss. de la Belgique, pl. lix. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 19, pl. lviii. lix. lx. figs. 3–5.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.

Lepidodendron dichotomum.
Bronn, Index Palæont. p. 630.
Dawson, Acadian Geol. 2nd ed. p. 487, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 160.
„ Canadian Nat. vol. viii. p. 450.
Ettingshausen, Steinkf. v. Radnitz, p. 52.
Feistmantel, O. (*in part*), Steinkf. v. Kralup. in Böhm, pp. 13 and 26.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 598.
„ Vers. d. Böhm. Kohlenab. p. 188, pl. xxxii. fig. 1 (excl. figs. 2–5).
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 298 301, and 303.
„ Steinkohl. u. Perm.-Ablager. p. 89.
„ K., Der Hangendflötzzug, p. 86.
Giebel, Deutschl. Petrefacten, p. 79.
Kimball, Flora from the Appalachian Coalfield, p. 25.
Lesquereux, Coal Flora in Pennsyl. p. 384, pl. lxiv. fig. 3.
Roehl (*in part*), Foss. Flora d. Steink. Form. Westph. p. 125, pl. viii. fig. 6 (excl. pl. xi. fig. 2).
Römer, Palaeontographica, vol. ix. p. 38, 1862.
Rost, De Fil. Ectypis, p. 9.
Sternberg, Vers. i. fasc. 1, pp. 19 and 23, pls. i. and ii. (excl. pl. iii.), Vers. ii. p. 177, pl. lxviii. fig. 1.

Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, and 143.
Unger, Synop. Plant. Foss. p. 128.
„ Genera et Species, p. 253.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 90.
„ Foss. Flora jüng. Steink. u. d. Rohl. p. 148.
Zeiller, Végét. Foss. du Terr. Houil. p. 107, pl. clxxii. fig. 1.

Sagenaria dichotoma.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, p. 34, pl. iii. figs. 2–7, 9, 12 (8 ?) (excl. figs. 1, 10, and 11).

Lycopodiolites dichotomus.
Sternberg, Vers. i. fasc. 4, p. ix. (excl. ref. pl. iii.).

Lepidodendron obovatum.
Brongniart, Prodrome, p. 86.
Ettingshausen, Steinkf. v. Radnitz, p. 54.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 874.
„ Report, Geol. Survey of Illinois, vol. ii. p. 455.
Lindley and Hutton, Foss. Flora, vol. i. pl. xix. *bis.*
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Newberry, Ann. Mag. Nat. Hist. 1883, p. 173.
Owen, Report, Geol. Survey of Wisconsin, p. 99, pl. vi. fig. 2.
Renault, Cours d. Botan. Foss. 1882, p. 13, pl. vi. fig. 5.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 129, pl. vi. fig. 1, pl. viii. fig. 8*b*, pl. xxix. fig. 15.
Sternberg, Vers. i. fasc. 1, pp. 20 and 23, pl. vi. fig. 1, pl. viii. fig. 1*a*, fasc. iv. p. x.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 140, 142, and 143.
Unger, Synop. Plant. Foss. p. 129.
„ Genera et Species, p. 255.
Zeiller, Végét. Foss. du Terr. Houil. p. 108.

Sagenaria obovata.
Bronn, Index Palæont. p. 1106.
Feistmantel, Vers. d. Böhm Kohlenab. p. 204, pl. xxxviii. figs. 1 and 3 (figs. 2 and 4 ?)
„ Jahrb. d. k. k. Reichsanst. vol. xxii. pp. 292, 301, 303.
„ Steinkohl. u. Perm-Ablager. p. 91.
Geinitz, Neues Jahrbuch, 1867, p. 279.
Giebel, Deutschl. Petrefacten, p. 81.
Gomes, Flora Foss. do. Terr. Carbon. do Porto, Serra do Bussaco, p. 28.
Sternberg, Vers. ii. p. 178, pl. lxviii. fig. 6.

Lepidodendron Lindleyanum.
Kimball, Flora from the Appalachian Coalfield, p. 24, 1857.
Unger, Synop. Plant. Foss. p. 130.
„ Genera et Species, p. 256.

Sagenaria Lindleyana.
Bronn, Index Palæont. p. 1106.
Sternberg, Vers. ii. p. 179.

Sagenaria Göppertiana.
Bronn, Index Palæont. p. 1106.
Giebel, Deutschl. Petrefacten, p. 81.
Göppert, Foss. Flora d. Ubergangsgebirges, p. 48, pl. xxxvii. fig. 1.
Sternberg, Vers. ii. p. 179, pl. xiv. fig. 2.

Lepidodendron elegans.
Brongniart, Hist. d. Végét. Foss. ii. pl. xiv.
„ Prodrome, p. 85.

Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 430, 1847.
„ Amer. Journ. of Science, 2nd ser. vol. ii. p. 231, 1846.
Dawson, Acadian Geol. 2nd ed. p. 488, 1868.
„ Quart. Journ. Geol. Soc. vol. xv. 1859, p. 67, vol. xxii. p. 161.
„ Canadian Nat. vol. viii. p. 450.
„ Foss. Plants Lower Carb. Canada, p. 37.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 140.
Kimball, Flora from the Appalachian Coalfield, p. 26, 1857.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 433.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cxviii., vol. iii. pl. cxcix.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Römer, Palaeontographica, vol. ix. p. 39, 1862.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 91.

Sagenaria elegans.
Feistmantel (*in part*), Steinkf. v. Kralup in Böhm. pp. 13 and 30.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 595.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, and 301.
„ Steinkohl. u. Perm.-Ablager. p. 91.

Lycopodiolites elegans.
Sternberg, Vers. i. fasc. 4, p. viii., pl. xvi. figs. 1, 2, 4.

Lycopodites elegans.
Bronn, Index Palæont. p. 681.

Lepidodendron dilatatum.
Dawson, Acadian Geol. 2nd ed. p. 488, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 161.
„ Canadian Nat. vol. viii. p. 450.
„ Foss. Plants of Lower Carb. Canada, p. 37.
Lindley and Hutton, Foss. Flora, vol. i. pl. vii. fig. 2.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Owen, Report, Geol. Survey of Wisconsin, p. 99, pl. vi. fig. 5
Roehl, Foss. Flora d. Steink. Form. Westph. p. 134, pl. viii. fig. 4, pl. x. fig. 9*a*.

Lycopodites dilatatus.
Bronn, Index Palæont. p. 681.

Lepidodendron gracile.
Brongniart, Hist. d. Végét. Foss. vol. ii. pl. xv.
? Bunbury, Quart. Journ. Geol. Soc. vol. iii. p. 430, 1847.
Dawson, Acadian Geol. 2nd ed. p. 488, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 161.
„ Canadian Nat. vol. viii. p. 450.
„ Foss. Plants of Lower Carb. Canada, p. 37.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 433.
Lindley and Hutton, Foss. Flora, vol. i. pl. ix.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Zeiller, Végét. Foss. du Terr. Houil. p. 112, pl. clxxii. fig. 2.

Lycopodites Lindleyanus.
Bronn, Index Palæont. p. 681.

Lepidodendron plumarium.
Dawson, Acadian Geol. 2nd ed. p. 488, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 162.
„ Canadian Nat. vol. viii. p. 450.
„ Foss. Plants of Lower Carb. Canada, p. 37.
Lindley and Hutton, Foss. Flora, vol. iii. pl. ccvii.

Unger, Synop. Plant. Foss. p. 132.
„ Genera et Species, p. 260.

Lycopodites plumarius.
Bronn, Index Palæont. p. 682.
Eichwald, Lethæa Rossica, vol. i. p. 112, pl. v. fig. 5.

Lycopodites longibracteatus.
Bronn, Index Palæont. p. 682.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488, pl. xxxviii. figs. 9–11.

Lepidodendron selaginoides.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 30.
Sternberg, Vers. i. fasc. 2, p 31, pl. xvi. fig. 3, pl. xvii. fig. 1.
Unger, Synop. Plant. Foss. p. 132.

Lycopodites selaginoides.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 144, pl. vi. figs. 2, 3, 4, and 5, pl. vii. fig. 3.

Lycopodiolites selaginoides.
Sternberg, Vers. i. fasc. 4, p. viii. pl. xvi. fig. 3, pl. xvii. fig. 1.

Lepidodendron rugosum.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 874.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 128.
Unger, Synop. Plant. Foss. p. 129.
„ Genera et Species, p. 254.

Sagenaria rugosa.
Bronn, Index Palæont, p. 1106.
Giebel, Deutschl. Petrefacten, p. 81.
Sternberg, Vers. ii. p. 178, pl. lxviii. fig. 4.

Sagenaria Martini.
König, Icones Fossilium Sectiles, pl. xiii. fig. 162.

Lepidodendron lycopodioides.
Sternberg, Vers. i. fasc. 2, p. 31, pl. xvi. figs. 1, 2, 4.
Zeiller, Végét. Foss. du Terr. Houil. p. iii., pl. clxxi.

Lepidodendron ophiurus.
Brongniart, Prodrome, p. 85.
Sauveur, Végét. Foss. de la Belgique, pl. lix. fig. 2.

Sagenaria ophiurus.
Brongniart, Class. d. Végét. Foss. pl. iv. fig. 1.

Lycopodiolites ophyurus.
Sternberg, Vers. i. fasc. 4, p. ix.

? Lepidodendron cordatum.
Brongniart, Prodrome, p. 86.

? Lycopodiolites cordatus.
Sternberg, Vers. i. fasc. 4, p. ix., pl. lvi. fig. 1 (fig. 3 ?).

Lycopodiolithes affinis.
Sternberg, Vers. i. fasc. 4, p. ix., pl. lvi. fig. 2 (fig. 1 ?).

Lepidodendron aculeatum.
Feistmantel (*non* Sternberg), Vers. d. Böhm. Kohlenab. pl. xl. figs. 3, 4.

Halonia gracilis.
Carruthurs, Geol. Mag. vol. x. p. 151, fig., 1873.

Lychnophorites superus.
Artis, Anted. Phytol. pl. xix.

Phytolithus plantites.
Martin, Petrificata Derbiensia, pl. xiv. fig. 4.

Palmacites verucosus.
Schlotheim, Petrefactenkunde, p. 395, pl. xv. fig. 5.

Remarks.—The synonymy of the various species of *Lepidodendron* is extremely difficult, on account of the great change that takes place in the form and dimensions of the leaf-scar as the plant increases in size and age. This circumstance has not always been sufficiently kept in view, and consequently many species have been created whose supposed specific characters are entirely dependent on the age of the specimen, and not on real structural differences.

The specimens of *Lepidodendron* which the Botanist has to examine are invariably mere fragments of a tree which attained the height of 100 feet; hence it is evident in plants whose leaf-scars keep pace in growth with the increase of the stem, and those on older and larger branches will differ considerably from those on the younger twigs, not only in size, but in the relative proportion of their width to their vertical height. In most species the increase in the girth of the stem has a tendency to produce a greater lateral increase in the proportions of the leaf-scars than is equalised by the upward growth of the trunk; consequently in some species, where the leaf-scars on the young twigs have a vertical length much greater than their width, their older conditions show proportionally a much greater transverse diameter.

These remarks apply more or less to all species of *Lepidodendron*, though in some the increase in size of the stem is accompanied by a vertical splitting of the bark, which must to a considerable extent influence the form of the leaf-scar on the older stems, in so far as it probably helps to neutralise the tendency of the leaf-scar to become laterally expanded.

Geinitz, under his *Sagenaria dichotoma*, appears to have included in error a specimen of *Lepidodendron longifolium* (l.c. pl. iii. fig. 1), and two specimens of *Lepidodendron rimosum* (pl. iii. figs. 10, 11). These I exclude from *Lepidodendron Sternbergii* (= *Lepidodendron dichotomum*). Figure 8 of the same plate is also probably referable to *Lepidodendron rimosum*.

Lepidodendron obovatum is only a varietal form of *Lepidodendron Sternbergii*, the apparent differences being consequent on the age of the specimens.

The exquisite figures given by Ettingshausen in his Steinkohlenflora von Radnitz (pl. xxvi. figs. 1, 2, pl. xxvii. and pl. xxviii.), as *Lepidodendron Sternbergii* do not belong to that species, but are the *Lepidodendron longifolium* of Brongniart.

Lepidodendron dilatatum, L. and H., is only a fragment of a stem of *Lepidodendron Sternbergii*, to which the leaf-bases are still attached, though their upper portions have been broken off.

Lepidodendron gracile, L. and H., and *Lepidodendron lycopodioides*, Sternberg, are only the younger branches of *Lepidodendron Sternbergii*, Brongniart. *Lepidodendron selaginoides*, Sternberg, also appears to me to be referable to the same species.

Lycopodites longibracteatus, Morris, which shows portions of an attached cone, is the same state of *Lepidodendron Sternbergii* as that to which Brongniart had previously applied the name of *Lepidodendron ophiurus*. Similar specimens showing the form of the leaf-scars in a state of great perfection are common in the ironstone nodules occurring so plentifully at Coalbrook Dale and in the neighbourhood of Dudley. To a specimen from one of these localities König has applied the name of *Sagenaria Martini*.

Lepidodendron plumarium, L. and H., is also, I think, to be referred to *Lepidodendron Sternbergii* as a young and fructifying branch.

Lepidodendron rugosum does not seem to be specifically distinct from *Lepidodendron Sternbergii*, and appears to be similar to the form named *Lepidodendron obovatum*, by Sternberg, with the addition of a few transverse

wrinkles on the medial line of the leaf-scar. Such wrinkles occur on individuals of many species, and are probably caused by shrinkage of the epidermal tissues.

Lycopodites affinis, Sternberg, and *Lycopodites cordatus*, of the same author, from Jarrow, are both, I am inclined to think, only portions of *Lepidodendron Sternbergii*. The first is the younger branches, the latter the older stem. If my conjectures on the affinities of *Lycopodites cordatus* are correct, the specimen from which the figure was taken cannot have been in a good state of preservation, and this view is borne out by the indistinct manner in which the leaf-scars are shown on Sternberg's plate.

Lepidodendron dichotomum, Bronn (Lethæa Geog. vol. i. pl. viii. fig. 2), does not appear to belong to the genus *Lepidodendron*, but to *Lepidophloios*.

In the Museum of Practical Geology is a very interesting and beautifully defined impression of *Lepidodendron Sternbergii*. The core, which lifts out of the impression, has all the characters of *Bergeria angulata*, Sternberg (Vers. ii. p. 184; pl. lxviii. fig. 17), from which *Bergeria rhombica*, Sternberg (l.c. pl. lxviii. fig. 18), and *Bergeria quadrata*, Sternberg (l.c. pl. lxviii. fig. 19), do not really seem to differ. The small vascular scar at the upper end of the leaf-scars of *Bergeria* is merely the small opening through which the foliar-bundle passed to the leaf, and not a vascular impression similar in structure to what is found in well-preserved Lepidodendroid leaf-scars. In the latter case there is the true outer surface of the leaf-scar, from which the leaf has been shed in the ordinary course of nature; in *Bergeria* the peculiar appearance of the leaf-scar has been brought about by the breaking over of the leaf, and the more or less ill-defined small scar at its upper angle is the opening through which the foliar vascular bundle passes.

The genus *Bergeria* I regard as only an incomplete condition of *Lepidodendron*.

Halonia gracilis, Carruthers, is a small branch of *Lepidodendron Sternbergii*, and not Lindley and Hutton's plant. Such unequally dichotomised Lepidodendroid specimens are by no means uncommon. The fossil from which Mr. Curruthers' figure was taken is in the Collection, and shows clearly the *Lepidodendron*, not *Lepidophloios* leaf-scar. The specimen figured as *Sagenaria Martini*, König, is also in the Collection.

Horizon.—Coal Measures.

Localities.—British. Durham: Sunderland. Lancashire: Bury. Lanarkshire: Shotts, Carluke. Northumberland: Felling Colliery, Newcastle-on-Tyne. Shropshire: Coalbrook Dale; Madeley Court (Presented by H. Pearce, Esq.). Staffordshire: Himley; Netherton; Tipton, near Dudley. Worcestershire: Bewdley; Forest of Wyre. Wales (South): Ebbw Vale; Merthyr-Tydvil.

Foreign. Bohemia: Wranowitz. France: St. Etienne. Saxony: Hainichen. Silesia: Waldenburg.

Var. obovatum.

British. Northumberland: Newcastle-on-Tyne.

Foreign. Moravia: Rossitz. Silesia: Waldenburg. United States: Orange Co., Indiana.

Lepidodendron aculeatum, Sternberg.

Lepidodendron aculeatum.

Brongniart, Prodrome, p. 86.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86.
Dawson, Acadian Geol. 2nd ed. p. 488, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 162.
„ Canadian Nat. vol. viii. p. 451.

Dawson, Foss. Plants of Lower Carb. Canada, pp. 32 and 37, pl. ix. fig. 75.
Ettingshausen, Steinkf. v. Radnitz, p. 53.
Lesquereux, Coal Flora of Pennsyl. p. 371, pl. lxiv. fig. 1.
„ Geol. of Pennsyl. vol. ii. p. 874.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Owen, Report, Geol. Survey of Wisconsin, p. 99, pl. vi. figs. 1–3.
Portlock, Geol. Report of Londonderry, p. 627.
Renault, Cours d. Botan. Foss. 1882, p. 12, pl. i. fig. 7, pl. vi. fig. 4.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 127.
Sauveur, Végét. Foss. de la Belgique, pl. lxiii. fig. 4.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 20, pl. lix. fig. 3, pl. lx. figs. 1, 2, and 6.
Sternberg, Vers. i. fasc. 1, pp. 20 and 23, pl. vi. fig. 2, and pl. viii. fig. 1*b*, fasc. 2, p. 25, pl. xiv. figs. 1, 2, 3, 4, and fasc. 4, p. x.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, and 143.
Unger, Synop. Plant. Foss. p. 129.
„ Genera et Species, p. 254.
Weiss, Verhandl. d. Natur. Vereines Preuss. Rheinl. u. Westph. 1868, p. 91.
Zeiller, Végét. Foss. du Terr. Houil. p. 109.
„ Flore Houil. des Asturies, p. 15.

Sagenaria aculeata.
Bronn, Index Palæont. p. 1106.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 208, pl. xli. fig. 1 (excl. pl. xl. figs. 3, 4).
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 299.
„ Steinkohl. u. Perm.-Ablager. p. 92.
„ Zeitsch. d. Deut. Geol. Gessel. vol. xxv. p. 598.
Geinitz, Neues Jahrbuch, 1867, p. 279.
Giebel, Deutschl. Petrefacten, p. 80.
Gomes, Foss. Flora do Terr. Carbon. do Porto, Serra do Bussaco, p. 27.
Sternberg, Vers. ii. p. 178, pl. lxviii. fig. 3.

Lepidodendron undulatum.
Brongniart, Prodrome, p. 86.
Ettingshausen, Steinkf. v. Radnitz, p. 56.
Giebel, Deutschl. Petrefacten, p. 79.
Sauveur, Végét. Foss. de la Belgique, pl. lxii. fig. 4.
Sternberg, Vers. i. fasc. 1, pp. 21 and 23, pl. x. fig. 2, fasc. 4, p. xi.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.
Unger, Synop. Plant. Foss. p. 133.
„ Genera et Species, p. 259.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph 1868, p. 91.

Sagenaria undulata.
Eichwald, Lethæa Rossica, vol. i. p. 126, pl. viii. fig. 8 (pl. ix. fig. 1 ?).

Aspidiaria undulata.
Bronn, Index Palæont. p. 110.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 205, pl. xxxix. figs. 1–4, pl. xl. fig. 1 (fig. 2 ?).
Sternberg, Vers. ii. p. 182, pl. lxviii. fig. 13.

Lepidodendron confluens.
Brongniart, Prodrome, p. 86.
Giebel, Deutschl. Petrefacten, p. 79.
Sauveur, Végét. Foss. de la Belgique, pl. lxii. fig. 3.
Sternberg, Vers. i. fasc. 4, p. xi.
Unger, Synop. Plant. Foss. p. 133.
„ Genera et Species, p. 259.

Aspidiaria confluens.
Bronn, Index Palæont. p. 110.
Sternberg, Vers. ii. p. 182.

Palmacites curvatus.
Schlotheim, Petrefactenkunde, p. 395, pl. xv. fig. 2.

Lepidodendron caudatum.
Unger, Synop. Plant. Foss. p 130.
„ Genera et Species, p. 255.

Sagenaria caudata.
Sternberg, Vers. ii. p. 178, pl. lxviii. fig. 7.

Lepidodendron cœlatum.
Brongniart, Prodrome, p. 86.
Sauveur, Végét. Foss. de la Belgique, pl. lxi. fig. 5.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 21.
Sternberg, Vers. i. fasc 4, p. 10.
Unger, Synop. Plant. Foss. p. 131.
„ Genera et Species, p. 257.

Sagenaria cœlata.
Brongniart, Class. d. Végét. Foss. pl. i. fig. 6.
Sternberg, Vers. ii. p. 181.

Lepidodendron crenatum.
Boulay, Terr. Houil. du Nord de la France, p. 37.
Brongniart, Prodrome, p. 86.
Ettingshausen, Steinkf. v. Radnitz, p. 53.
Göppert, Syst. Fil. Foss. p. 465, pl. xlii. figs. 4–6.
Heer, Flora Foss. Helv. lief. i. p. 37.
Lesquereux, Coal Flora of Pennsyl. p. 394.
„ Geol. of Pennsyl. vol. ii. p. 874.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 128.
Sauveur, Végét. Foss. de la Belgique, pl. lxiii. fig. 2.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 21.
Sternberg, Vers. i. fasc. 1, pp. 20 and 23, pl. viii. fig. 2*b*, fasc. 4, p. x.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.
Unger, Synop. Plant. Foss. p. 129.
„ Genera et Species, pp. 254 and 256.

Sagenaria crenata.
Bronn, Index Palæont. p. 1106.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 35.

Lepidodendron urœum.
Wood, Trans. Amer. Phil. Soc. vol. xiii. p. 343, pl. ix. fig. 5.

Lepidodendron Charpentieri.
Göppert, Syst. Fil. Foss. p. 463, pl. xlii. fig. 1.

Lepidodendron Pagenstecheri.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 134, pl. xxvii. fig. 3.
Römer, Palaeontographica, vol. ix. p. 39, pl. ix. fig. 4, 1862.

Lepidodendron Bartlingi.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 134, pl. xxxii. fig. 3.
Römer, Palaeontographica, vol. ix. p. 40, pl. x. fig. 1, 1862.

Lepidodendron obovatum.
Bronn, Lethæa Geog. vol. i. part ii. p. 126, pl. vi. fig. 8.
Sauveur, Végét. Foss. de la Belgique, pl. lxiii. fig. 3.

Lepidodendron.
King, Edinb. New Phil. Journ. vol. xxxvi. pl. iv. figs. 2 and 4, 1843–4.

Lepidodendron imbricatum.
Sauveur, Végét. Foss. de la Belgique, pl. lxii. fig. 2.

Schuppenpflanze.
Rhode, Beitr. z. Pflanzen. d. Vorwelt, pp. 8, 9, pl. i. figs. 5, 6.

? Rhytidophloyos tenuis.
Corda, Flora d. Vorwelt, p. 30, pl. ix. fig. 20.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 57.

Remarks.—*Lepidodendron Pagenstecheri*, Römer, does not seem to differ in any way from *Lepidodendron aculeatum*. *Aphyllum asperum*, Artis (Anted. Phytol. pl. xxiii.), is only a badly preserved specimen of this species. To this plant also are most probably to be referred as imperfectly preserved conditions—

Aphyllum cristatum, Artis, Anted. Phytol. pl. xvi.
Sigillaria appendiculata, Brongniart, Hist. d. Végét. Foss. p. 420, pl. cxli. fig. 2.
Lepidodendron appendiculatum, Sternberg, Vers. i. fasc. 3, p. 38, pl. xxviii.
Caulopteris appendiculata, Unger, Genera et Species, p. 197.

Lepidodendron cœlatum, Brongniart, is here placed under *Lepidodendron aculeatum*, there being no characters by which it can be satisfactorily distinguished from that species.

Horizon.—Coal Measures.

Localities.—*British.* Lanarkshire : Monkland, near Airdrie ; Shotts. Northumberland : Newcastle-on-Tyne. Somersetshire : Bedminster, Bristol. Worcestershire : Bewdley ; Forest of Wyre. Yorkshire : Banktop. Wales (South) : Ebbw Vale, near Merthyr-Tydvil.
Foreign. Silesia : Waldenburg.

Lepidodendron modulatum, Lesquereux.

Lepidodendron modulatum.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 874, pl. xv. fig. 1.
„ Coal Flora of Pennsyl. p. 385, pl. lxiv. figs. 13, 14.
„ Report, Geol. Survey of Illinois, vol. iv. p. 430.
„ Boston Journ. Nat. Hist. vol. vi. p. 428.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 25.

Lepidodendron distans.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 212, pl. xlviii. fig. 3.

Lepidodendron conicum.
Lesquereux, Boston Journ. Nat. Hist. vol. vi. p. 428.
„ Geol. of Pennsyl. vol. ii. p. 874, pl. xv. fig. 3.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 26.

Lepidodendron caudatum.
Roehl (*in part*), Foss. Flora d. Steink. Form. Westph. pl. vi. fig. 7.

Remarks.—This species much resembles *Lepidodendron aculeatum*, and may, perhaps, be only a variety of it, but for the present I prefer treating it as specifically distinct.

A very interesting communication "On the Variations of the Leaf-scars of *Lepidodendron aculeatum*, Sternberg," by Mr. Fairchild, appears in the Annals of the New York Academy of Sciences (vol. i. p. 77, pls. v.–ix.), 1877). This author is of opinion that *Lepidodendron modulatum* and certain other species are only different ages and states of preservation of *Lepidodendron aculeatum*. The subject still requires to be carefully examined into.

Horizon.—Coal Measures.

Locality.—*British.* Durham : Sunderland.

Lepidodendron longifolium, Brongniart.

Lepidodendron longifolium.
Brongniart, Prodrome, p. 85.
Lesquereux, Coal Flora of Pennsyl. p. 373.
? Lindley and Hutton, Foss. Flora, vol. iii. pl. clxi.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 22.
Unger, Synop. Plant. Foss. p. 132.
„ Genera et Species, p. 260.

Lycopodites longifolius.
Bronn, Deutschl. Petrefacten, p. 85.
Giebel, Index Palæont. p. 682.

Lepidodendron Sternbergii.
Ettingshausen, Steinkf. v. Radnitz, p. 54, pl. xxvi. figs. 1, 2; pl. xxvii. and pl. xxviii.
Sternberg (*in part*), Vers. i. fasc. 1, p. 23, pl. iii.

Sagenaria dichotoma.
Geinitz (*in part*), Vers. d. Steinkf. in Sachsen, pl. iii., fig. 1.

Remarks.—The specimen which forms the subject of Lindley and Hutton's plate clxi., named by them *Lepidodendron longifolium*, is, I think, more probably referable to *Sigillaria Brardii*, Brongniart. The leaf-scars are very much obscured by the foliage, and though I have carefully examined the specimen, I am unable definitely to say whether this example should be referred to *Sigillaria Brardii* or to *Lepidodendron longifolium*.

The leaf-scars on the specimen from Shotts agree so closely with Ettingshausen's beautiful figures of *Lepidodendron longifolium* (=*Lepidodendron Sternbergii*, Ettingshausen), that I have placed it under that species. The only specimens, however, which can with certainty be referred to *Lepidodendron longifolium* are those which show the foliage as well as the leaf-scars, as on the example in the Collection from Newcastle-on-Tyne.

The difference between the foliage of *Lepidodendron Sternbergii* and *Lepidodendron longifolium* is such that, notwithstanding the great similarity of the leaf-scar, it is almost impossible to regard them as only representing different states of the same species.

Horizon.—Coal Measures.
Localities.—British. Lanarkshire: Shott's Iron Works (Presented by the British Association). Northumberland: Newcastle-on-Tyne.

Lepidodendron serpentigerum, König.

Lepidodendron serpentigerum.
König, Icones Fossilium Sectiles, pl. xvi. fig. 195.

Lepidodendron cheilalæum.
Wood, Trans. Amer. Phil. Soc. vol. xiii. p. 346, pl. ix. fig. 4.

Lepidodendron distans.
Lesquereux, Coal Flora of Pennsyl. p. 387, pl. xliv. fig. 10.
„ Geol. of Pennsyl. vol. ii. p. 874, pl. xvi. fig. 5.
„ Boston Journ. Nat. Hist. vol. vi. p. 429.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 27.

Lepidodendron oculatum.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 874, pl. xvi. fig. 4.
„ Boston Journ. Nat. Hist. vol. vi. p. 428.

Horizon.—Coal Measures.
Locality.—British. Northumberland: Newcastle-on-Tyne.

Lepidodendron rimosum, Sternberg.

Lepidodendron rimosum.
Boulay, Terr. Houil. du Nord de la France, p. 37.
Brongniart, Prodrome, p. 86.
Dawson, Acadian Geol. 2nd ed. p. 487, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 161, pl. ix. fig. 42.
„ Canadian Nat. vol. viii. p. 450.
„ Foss. Plants of Lower Carb. Canada, p. 37.
Etheridge, Cat. Australian Fossils, p. 31.
Ettingshausen, Steinkf. v. Radnitz, p. 56.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 139.
Lesquereux, Coal Flora of Pennsyl. p. 393, pl. lxiv. fig. 11.
„ Geol. of Pennsyl. vol. ii. p. 874.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. 1882, p. 15, pl. v. figs. 6, 7.
Roehl, Foss. Flora d. Steinkf. Form. Westph. p. 132, pl. viii. fig. 1, and pl. x. fig. 2.
Sauveur, Végét. Foss. de la Belgique, pl. lxii. fig. 1.
Sternberg, Vers. i. fasc. 1, pp. 21 and 23, pl. x. fig. 1, and fasc. 4, p. xi.
Unger, Synop. Plant. Foss. p. 131.
„ Genera et Species, p. 257.
„ Neues Jahrbuch, 1842, p. 608.

Sagenaria rimosa.
Bronn, Index Palæont. p. 1106.
Eichwald, Lethæa Rossica, vol. i. p. 125, pl. vii. fig. 7.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 595.
„ Vers. d. Böhm. Kohlenab. p. 210, pl. xlviii. fig. 1, and pl. xlix. fig. 1.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 293.
„ Steinkohl. u. Perm.-Ablager, p. 92.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 35, pl. iii. figs. 13–15, pl. iv. fig. 10 (excl. pl. ii. figs. 1 and 4, and pl. x. fig. 2 ?).
Giebel, Deutschl. Petrefacten, p. 81.
Sternberg, Vers. ii. p. 180, pl. lxviii. fig. 15.

Lepidodendron fusiforme.
Ettingshausen, Steinkf. v. Radnitz, p. 55.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 139.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 33.
Unger, Genera et Species, p. 257.

Sagenaria fusiformis.
Corda, Flora d. Vorwelt, p. 20, pl. vi.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 212, pl. xlviii. fig. 2.
Giebel, Deutschl. Petrefacten, p. 81.

Lepidodendron selaginoides.
? Lindley and Hutton, Foss. Flora, vol. i. pl. xii., vol. ii. pl. cxiii.
Heer, Flora Foss. Helv. lief. i. p. 37, pl. xvi. fig. 6 (fig. 7 ?).

Lycopodites selaginoides.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 184, pl. xxx. figs. 3, 4, and pl. xxxi.

Lepidostrobus Lycopodites.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 184.

Lepidodendron dubium.
Wood, Trans. Amer. Phil. Soc. vol. xiii. p. 344, pl. viii. fig. 4.

Sagenaria dichotoma.
Geinitz, Vers. d. Steinkf. in Sachsen, pl. iii. fig. 11.

Lepidodendron undulatum.
Roehl, Foss. Flora d. Steinkf. Form. Westph. p. xxxii. fig. 1.

Lepidodendron caudatum.
? Roehl, Foss. Flora d. Steink. Form. Westph. pl. viii. fig. 7.

Aspidiaria undulata.
? Geinitz, Vers d. Steinkf. in Sachsen, p. 37, pl. iii. fig. 17.

? Lepidodendron Pictœnse.
Dawson, Acadian Geol. 2nd ed. pp. 454 and 487, fig. 169*a*, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 160, pl. ix. fig. 37, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 449.
„ Foss. Plants of Lower Carb., Canada, p. 37.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 29.

? Lepidodendron plicatum.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 162, pl. ix. fig. 38.
Schimper Traité Paléont. Végét. vol. ii. p. 29.

Lepidodendron simplex.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 454, pl. xlv. fig. 5.

Lepidodendron.
King, Edinb. New Phil. Journ. vol. xxxvi. pl. v. fig. 3.

Lepidodendron dissitum.
Sauveur, Végét. Foss. de la Belgique, pl. lix. fig. 3; pl. lxi. fig. 6.

Lepidodendron elegans.
? Sauveur, Végét. Foss. de la Belgique, pl. lix. fig. 4.

Phytolithus (cancellatus).
Martin, Petrificata Derbiensia, pl. xiii. fig. 3.

Remarks.—The plant figured by Lindley and Hutton under the name of *Lepidodendron selaginoides* belongs, I believe, to this species. The specimen from which their figure was taken, and which is preserved in the "Hutton Collection," has been very much restored in the plate, and embodies more the ideas of the artist than the appearance of the plant. The curious little scales on the uppermost lateral branch and on the basal portions of the two other branches are quite imaginary, neither are the leaf-scars so beautifully preserved on the specimen as represented in the figure; in fact, the specimen is so indifferently preserved that it is very difficult to determine the species to which the plant belongs, but from what can be learnt it appears to be *Lepidodendron rimosum*, Sternberg.

The specimen from which their plate cxiii. was taken is not in the "Hutton Collection" now, but it in all likelihood belongs to this species also, for they give as a reference their plate xii., and the form of the leaf-scars, as represented on their figure, seems to be that of *Lepidodendron rimosum.*

Horizon.—Coal Measures.

Localities.—*British.* Durham: Sunderland. Northumberland: Newcastle-on-Tyne. Staffordshire: Sandwell Park Trial Sinking, Westbromwich. Yorkshire: near Halifax.
Foreign. Africa (South): Stormberg Mountains (?). Saxony: Zwickau. Silesia: Waldenburg. Russia: near Kosloo, Black Sea.

Lepidodendron Haidingeri, Ettingshausen.

Lepidodendron Haidingeri.
Boulay, Terr. Houil. du Nord de la France, p. 74.
Ettingshausen, Steinkf. v. Radnitz, p. 55, pl. xxii. and xxiii.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. iv. p. 435.

Schimper, Traité d. Paléont. Végét. vol. ii. p. 23.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, and 143.

Sagenaria elegans.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 203, pl. xxxvii. fig. 3 (Syn. in part).

Remarks.—This species is apparently closely related to *Bergeria acuta*, Sternberg (Vers. ii. p. 184, pl. xlviii. fig. 1*a–b*), which seems to be a true species of *Lepidodendron*. *Sagenaria acuta*, Eichwald (Lethæa Rossica, vol. i. p. 124, pl. vi. figs. 11, 12), is not Sternberg's *Bergeria acuta*. Eichwald's fig. 12 has a great similarity to *Lepidodendron Volkmannianum*.

Feistmantel is mistaken in uniting *Lepidodendron Haidingeri* with *Lepidodendron elegans*, which latter is only a form of *Lepidodendron Sternbergii*.

Horizon.—Coal Measures.

Localities.—Foreign. Bohemia: Kralup. Saxony: Zwickau.

Lepidodendron Rhodeanum, Sternberg.

Lepidodendron Rhodeanum.
Boulay, Terr. Houil. du Nord de la France, p. 37.
Brongniart, Prodrome, p. 85.
Kidston, in Cadell. Trans. Edinb. Geol. Soc. vol. iv. p. 335.
Sternberg, Vers. i. fasc. 4, p. xi.
Stur, Culm Flora, heft ii. p. 389. pl. xxiii. fig. 1, pl. xxiv. figs. 1, 2, and 3.
Unger, Synop. Plant. Foss. p. 130.
„ Genera et Species, p. 255.

Sagenaria Rhodea.
Bronn, Index Palæont. p. 1107.
Giebel, Deutschl. Petrefacten, p. 81.
Sternberg, Vers. ii. p. 179.

Sagenaria depressa.
Göppert, Flora d. Sil. Devon. u. Unter-Kohl. p. 520
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 195.
„ Foss. Flora d. Ubergangsgebirges, p. 179, pl. xliii. figs. 5, 6.
Sandberger, Vers. d. Rhein. Schich. in Nassau, p. 431, pl. xxxviii. fig. 8.

? Lepidodendron clypeatum.
Lesquereux, Coal Flora of Pennsyl. pl. lxiv. fig. 16.

Lepidodendron Sternbergii.
Dawson, Quart. Journ. Geol. Soc. vol. xv. p. 68, fig. 3, 1859.

Schuppenpflanze.
Rhode, Beitr. z. Pflanzen d. Vorwelt, p. 7, pl. i. figs. 1, 3, and 4.

Horizon.—Coal Measures.

Locality.—British. Staffordshire: Kiln Coal Shale, Goyts Trough.

Horizon.—Carboniferous Limestone Series (?).

Locality.—British.—Lanarkshire: Carluke.

Lepidodendron Veltheimianum, Sternberg.

Lepidodendron Veltheimianum.
Bronn, Index Palæont. p. 631.
Dawson, Foss. Plants of Lower Carb. Canada, p. 8.
Etheridge, Cat. Australian Fossils, p. 31.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 138.
Heer, Urwelt d. Schweiz, p. 7, fig. 2.
„ Foss Flora d. Bären Insel, p. 38, pl. viii. figs. 1, 2*a–b*, 3, 4, 5*a*, 6, 7, pl. ix. figs. 3, 4 (fig. 2*a* ?).
„ Steink. Flora d. Artischen. Zone, p. 4, pl. iv. and pl. v. fig. 3.
? „ Flora Foss. Helv. lief. 1, p. 37, pl. xviii. fig. 6.

Kidston, in Cadell, Trans. Edinb. Geol. Soc. vol. iv. p. 335.
König, Icones Fossilium Sectiles, pl. xviii. fig. 236.
Lesquereux, Coal Flora of Pennsyl. p. 374, pl. lxii. figs. 6–8.
„ Report, Geol. Survey of Illinois, vol. ii. p. 455.
Renault, Cours d. Botan. Foss. p. 9, pl. v. figs. 1, 2, 1882.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 29.
Schmalhausen, Mélanges Phys. et Chemique, vol. x. p. 745, pl. i. figs. 4–7.
Sternberg, Vers. i. fasc. 4, p. xii. pl. lii. fig. 3.
Sterzel, Bericht d. Naturwiss. Gesell. zu Chemnitz, vol. ix. p. 215, 1884.
Stur, Culm Flora, heft i. p. 79, heft ii. p. 375, pl. xviii. figs. 2, 3, pl. xix. figs. 5, 6 (8 ?), 9, 10, pl. xx. figs. 1–6, pl. xxi. xxii. fig. 3 (excl. figs. 1, 2).
Unger, Genera et Species, p. 256.
Zeiller, Végét. Foss. du Terr. Houil. p. 110, pl. clxxii. figs. 3, 4.

Sagenaria Veltheimiana.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 299.
Ebray (*in part*), Végét. Foss. d. Terr. d. Transition, p. 19, pls. v.–viii.
Eichwald, Lethæa Rossica, vol. i. p. 119, pl. vii. figs. 2–6.
Ettingshausen, Denks. k. Akad. Wiss. vol. xxv. p. 106.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 528, pl. xvii. figs. 31, 32.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 51, pls. iv.–vi. figs. 1–3.
Giebel, Deutschl. Petrefacten, p. 80.
Göppert, Foss. Flora d. Ubergangs. p. 180, pls. xvii. xviii. xix. xx. and xxiii. figs. 1–3; pls. xxiv. and xliii. fig. 1.
„ Neues Jahrbuch, 1847, p. 684.
„ Flora d. Sil. Devon. u. Unter. Kohl. p. 520, pl. xl. figs. 3, 4, pl. xli. figs. 2–4, pl. xlii. fig. 1 and pl. xliii.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 195.
Römer, Palaeontographica, vol. iii. p. 46, pl. vii. fig. 14, 1854, vol. v. p. 40, pl. viii. figs. 1, 2 (figs. 4, 5 ?), vol. ix. p. 10, pl. iii. fig. 6, 1862.
„ Geol. v. Oberschlesien, p. 55.
Schimper, Végét. Foss. du Terr. de Trans. d. Vosges, p. 336, pls. xx. xxi. xxii. and xxvi. fig. 6.
Sternberg, Vers. ii. p. 180, pl. lxviii. fig. 14.

Stigmaria (?) Veltheimiana.
Brongniart, Prodrome, p. 88.
Unger, Synop. Plant. Foss. p. 117.

Lepidodendron acuminatum.
Stur, Culm Flora, heft ii. p. 397, pl. xxxix. fig. 4.
Unger, Genera et Species, p. 261.

Sagenaria acuminata.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 533.
Göppert, Flora d. Sil. Devon. u. Unter. Kohl. p. 524.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. p. 196.
„ Foss. Flora d. Ubergangs. p. 185, pl. xxiii. fig. 4, pl. xliii. figs. 8–10.
„ Neues Jahrbuch, 1847, p. 684.
Ludwig, Palaeontographica, vol. xvii. p. 123, pl. xxvi. fig. 2.
Römer, Geol. v. Oberschlesien, p. 55.
Schimper, Végét. du Terr. Trans. d. Vosges, p. 338, pl. xxvi. figs. 1–5.

Lepidodendron geniculatum.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 33.

Sagenaria geniculata.
Giebel, Deutschl. Petrefacten, p. 80.
Göppert, Foss. Flora d. Ubergangs. p. 186.
Römer, Palaeontographica, vol. iii. p. 46, pl. vii. fig. 13, 1854.

Lepidodendron patens.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 36.

Selaginites patens.
Brongniart, Prodrome, p. 84.
„ Hist. d. Végét. Foss. vol. ii. pl. xxvi.
Bronn, Index Palæont. p. 1132.
Unger, Synop. Plant. Foss. p. 141.
„ Genera et Species, p. 272.

Lepidodendron Glincanum.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 34.
Schmalhausen, Mém. Acad. Imp. St. Petersb. vii^e^ sér. vol. xxxi. p. 11, pl. ii. figs. 1 and 5–15, pl. iii. figs. 1-14, 1883 (excl. other figs. and syn. *L. Volkmannianum*).

Sagenaria Glincana.
Eichwald, Lethæa Rossica, vol. i. p. 127, pl. v. figs. 21, 22, pl. v*a*. figs. 1–6 (? figs. 7–10).

Sagenaria confluens.
Eichwald, Lethæa Rossica, vol. i. p. 121, pl. vii. fig. 1 (excl. syns.).

Lepidodendron gracile.
Römer, Palaeontographica, vol. xiii. p. 213, pl. xxxv. fig. 7.

Lepidodendron Jaschei.
Römer, Palaeontographica, vol. xiii. p. 213, pl. xxxv. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 32.

Sagenaria polyphylla.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 53, pl. vii.

Sagenaria aculeata.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 531, pl. xvii. fig. 33.
Göppert, Flora d. Sil. Devon. u. Unter. Kohl. p. 519, pls. xxxix.–xli.

Lepidodendron Sternbergii.
Heer, Foss. Flora Spitzbergens, p. 11, pl. iii. figs. 1–20; pl. iv. figs. 3, 4 (excl. refs.).

Lepidodendron selaginoides.
Heer, Foss. Flora Spitzbergens, p. 14, pl. iii. fig. 21.

Sagenaria caudata.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 53, pl. iv. fig. 4.
Römer, Palaeontographica, vol. ix. p. 9, pl. iii. fig. 5, 1862.

Sagenaria elliptica.
Göppert, Foss. Flora d. Ubergangs. p. 184, pl. xliii. fig. 7.
Ludwig, Palaeontographica, vol. xvii. p. 122, pl. xxvi. figs. 1*a*, *b*, *c*, *d*.

Lycopodites dilatatus.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 46, pl. x. fig. 1.

Lepidodendron ornatissimum.
Brongniart, Prodrome, p. 85.
„ Hist. d. Végét. Foss. vol. ii. pl. xviii.
Sternberg, Vers. i. fasc. 4. p. xii.

Lepidodendron commutatum.
Heer, Foss. Flora d. Bären Insel, p. 39, pl. vii. figs. 8–10.

Bergeria regularis.
Schmalhausen, Bull. l'Acad. Imp. St. Pétersb. vol. xxii. p. 281, pl. ii. figs. 4, 5.

Bergeria alternans.
Schmalhausen, Bull. Acad. Imp. St. Pétersb. vol. xxii. p. 281, pl. ii. fig. 6.

Knorria acicularis.
Göppert, Foss. Flora d. Ubergangs. p. 200, pl. xxx. fig. 3.
Heer, Foss. Flora d. Bären Insel, p. 42, pl. viii. fig. 2*d*; pl. x. figs. 6, 7.

? Knorria anceps.
Eichwald, Lethæa Rossica, vol. i. p. 153, pl. xii. figs. 2, 3.

? Knorria mammillaris.
Eichwald, Lethæa Rossica, vol. i. p. 155, pl. ix. fig. 4.

Knorria imbricata.
Geinitz, Flora d. Hainich.-Ebersdorfer, p. 57, pl. viii. fig. 3; pl. ix. figs. 1–3 (excl. 2 and 4).

Flemingites Pedroanus.
Carruthers, Geol. Mag. vol. vi. p. 151, pl. v. 1869.

? Ptychopteris microdiscus.
Eichwald, Lethæa Rossica, vol. i. p. 106. pl. v. figs. 2, 3.

Ulodendron commutatum.
Lesquereux, Coal Flora of Pennsyl. p. 401, pl. lxvi. fig. 2.
Schmalhausen, Mém. l'Acad. Imp. St. Pétersb. vii^e sér. vol. xxxi. p. 17, pl. iv. figs. 7, 8, 1883.
Schimper, Traité d. Palćont. Végét. vol. ii. p. 40, pl. lxiii.

Ulodendron parmatus.
Carruthers, Monthly Micro. Journ. vol. iii. p. 152, pl. xliv. fig. 4, 1870.

Ulodendron Allani.
Bronn, Index Palæont. p. 1341.
Buckland, Geol. and Mineral. vol. ii. p. 92, pl. lvi. fig. 3.

Ulodendron ovale.
Carruthers, Monthly Micro. Journ. vol. iii. p. 152, pl. xliv. fig. 1.

Ulodendron pumilum.
Eichwald, Lethæa Rossica, vol. i. p. 144, pl. x. fig. 5.

Ulodendron Rhodeanum.
Bronn, Index Palæont. p. 1341.
Unger, Synop. Plant. Foss. p. 135.

Ulodendron Rhodii.
Buckland, Geol. and Mineral. vol. ii. p. 93, pl. lvi. fig. 6.

Ulodendron ellipticum.
? Bronn, Index Palæont. p. 1341.
Eichwald, Lethæa Rossica, vol. i. p. 140, pl. ix. figs. 6, 7, pl. x. figs. 3, 4 and 6.
? Goldenberg, Flora Saræp. Foss. heft i. p. 18.
? Sternberg, Vers. ii. p. 186, pl. xlv. fig. 2.
? Unger, Synop. Plant. Foss. p. 135.
? „ (*in part*), Genera et Species, p. 264.

Ulodendron minus.
Thompson (*in part*), Trans. Geol. Soc. Edinb. vol. iii. p. 341, pl. *a*, figs. 2, 3

Ulodendron transversum.
Eichwald, Lethæa Rossica, vol. i. p. 139, pl. ix. fig. 8 (? pl. vi. fig. 13).

Ulodendron ornatissimum.
Tate, in Johnston's Nat. Hist. Eastern Borders, vol. i. p. 302, 1853.

Phytolithus parmatus.
Steinhauer (*in part*), Trans. Amer. Phil. Soc. vol. i. 2nd. ser. p. 287, pl. vii. fig. 1, 1818.

Vegetable Impression.
Allan, Trans. Roy. Soc. Edinb. vol. ix. p. 235, pl. xiv. 1823.

Shuppenpflanzen.
Rhode, Beitr. z. Pflanz. d. Vorwelt. p. 16, pl. iii. figs. 1–8.

Remarks.—Several species of *Ulodendron* are united here.

Many palæobotanists have already adopted the view that the genus *Ulodendron* is only a condition of *Lepidodendron*. In this I so far agree, but though several species of *Ulodendron* belong to *Lepidodendron*, there are other named species of *Ulodendron*, which in the form and arrangement of their leaf-scars agree entirely with the Clathrarian-Sigillariæ. Hence certain of these so-called *Ulodendron* have been placed by me in *Sigillaria*. This latter view is not the opinion generally accepted, but I have come to this conclusion after an examination of many beautifully preserved specimens. Almost all the misconceptions on the true affinities of *Ulodendron* have arisen through the neglect of a very essential element for the right understanding of these fossils, and one which only requires to be mentioned to be accepted by all botanists, viz., that only *well-preserved* examples should be taken into consideration when critically considering the affinities of this genus; unfortunately this has not always been done.

When determining the various species of the genera *Lepidodendron* and *Sigillaria*, unless the outer surface of the bark is well preserved and exhibits the form and arrangement of the leaf-scars, it is admitted that the plants do not show the characters by which a specific, or even in some cases, a generic determination can be made. In *Ulodendron*, on the other hand, though it is difficult to account for it, decorticated and badly-preserved specimens, if only they show the characteristic scar of the genus, have often been regarded as in a sufficiently good state of preservation, not only for generic identification, but even for the creation of new species, notwithstanding that the close affinity of *Ulodendron* and *Lepidodendron*, both in regard to their internal structure and general characters, is fully recognised.

The form and size of the large scars have commonly been made the character on which the various species of *Ulodendron* have been founded—the description generally mentioning as the chief distinguishing point "scar so long by so broad." Such arbitrary specific distinctions to be of any value must infer that the plant sprang into existence with the large Ulodendroid-scars fully developed; this view of course was never intended by the authors who described the various species, characterised as indicated above; but to make the species of true value, an inference of this nature is quite legitimate.

Now it is obvious that the Ulodendroid-scars when they first appeared were very small, and this I have proved to be the case by observation, having traced them through their different stages of growth on stems of *Lepidodendron Veltheimianum*, Sternb., where the leaf-scars were well preserved. Or, on stems having leaf-scars similar in all respects to those of *Lepidodendron Veltheimianum*, Sternb., and of which, had portions of the stems been broken off, either from between or from the sides of the scars, could not have been by any character distinguished from specimens of that plant.

On a specimen of *Sigillaria* (*Ulodendron*) *Taylori*, Carr., to be referred to again, I have observed the appendicular organs attached, when only about three-quarters of an inch in length, and the branch bearing them must have been of considerable breadth, for though its full breadth, as shown on the specimen, is only about 3 inches, still it has probably been a little broader. The earliest stage of the Ulodendron-scars of *Lepidodendron Veltheimianum* with which I am acquainted, is shown on a specimen 22 inches long and fully

4 inches wide. Here they are merely indicated as a point to which an appendicular organ has been attached, placed on a slight oval inflation. On the greater portion of this inflation the leaf-scars are preserved, showing their ordinary form, and running in the same series as the other leaf-scars on the stem. As the appendicular organ develops, its base pressing on the outer surface of the bark eventually obliterates all trace of the leaf-scars, whose presence is subsequently represented by so many little mamillæ-like points—the extremities of the vascular bundles of the aborted leaves. By the increase in girth of the stem, the bark swells up round the base of the attached organ, and thus the two vertical rows of depressions are formed, which keep pace in growth with the increase in size of the stem. This progression I have followed through a large series of specimens.

In 1853, Tate* clearly pointed out that the only difference between *Ulodendron* and *Lepidodendron* was the presence on the former of the large lateral scars. He says, speaking of *Ulodendron*, "specimens obtained from Alnwick Moor enable us to add something to the knowledge of its form." "Its internal structure is the same as that of *Lepidodendron;* it possessed similar leaves and rhomboidal areolæ on the stem and branches. A specimen in Alnwick Castle shows that its mode of branching is dichotomous like the *Lepidodendron*, but in addition there are rows of round or oval scars on opposite sides of the stem arranged vertically, and these scars continue upward on the same plane along the branches, while other rows commencing at the point of forking run upon the opposite side of the branches; the scars and the branches are all in the same plane. These scars appear to have been the points of attachment of masses of inflorescence, which had consisted of sessile cones formed of imbricated scales, in a manner similar to a fir cone. The chief difference between *Lepidodendron* and *Ulodendron* would therefore be that the cones, bearing sporules or seed, were placed at the end of the branches on the former, but their position on the latter was in linear rows on the stem and branches." This quotation contains the essence of the whole subject—whether the presence of lateral appendicular organs (whether cones or bulbils) is a sufficient difference on which to found generic distinction.

Stur believes that the large Ulodendroid-scars bore bulbils, but from the specimen of *Sigillaria* (*Ulodendron*) *Taylori*, Carr., figured by Prof. D'Arcy Thompson, I should be rather inclined to think that they bore cones, but this I am unable to decide, nor does it influence the point immediately at issue.

Lepidodendron Veltheimianum did however bear terminal cones, and Mr. C. W. Peach has shown me a large specimen which exhibits 22 cones attached to the ends of the branches; but this circumstance does not make it impossible for *Lepidodendron Veltheimianum* to have also had lateral appendicular organs.

As far as the evidence goes, then, it would appear that *Lepidodendron Veltheimianum* had, in addition to the true terminal cones as in other species of *Lepidodendron*, two vertical rows of lateral appendicular organs, which have left behind the characteristic Ulodendroid-scars. This conclusion is founded on the fact that the form and arrangement of the leaf-scars on stems showing the Ulodendroid-scar, as well as on those which have no such marking, and which constitute the *Lepidodendron Veltheimianum*, Sternberg, are in all respects identical and cannot be distinguished from each other. They also occur associated together in the same beds. The union therefore of those stems, variously named *Ulodendron parmatum*, *Ulodendron commutatum*, &c., with *Lepidodendron Veltheimianum*, seems to be an inevitable conclusion.

There is another view of this subject, which some Botanists may be inclined to take, and which must not be passed over without remark. According to these the presence of the Ulodendroid-scars themselves may be of sufficient importance for the creation of a distinct genus. If we accept this view,

* Nat. History of the Eastern Borders, vol. i. p. 302, 1853.

Lepidodendron Veltheimianum must be removed from *Lepidodendron* and placed in a separate genus, but not in *Ulodendron*, as at present constituted, and for the following reasons :—Those who still regard *Ulodendron* as a true genus include in it two distinct groups of plants—those with leaf-scars *identical* with *Lepidodendron*, as *Ulodendron parmatum*, and others with leaf-scars identical in form and arrangement with the Clathrarian-Sigillaria as in *Ulodendron majus*, L. and H. (= *Ulodendron minus*, L. and H.). Now in *Lepidodendron* and *Sigillaria* the form and arrangement of the leaf-scar is the character in which generic difference chiefly lies, but in *Ulodendron*, where plants closely allied to the two former genera are included, the character of the leaf-scar is all but entirely ignored.

It is true that Ulodendroid specimens seldom show the leaf-scars well preserved, and that on many of the described species of *Ulodendron* they have not been observed; still that does not alter the fact that when well-preserved examples are examined, the leaf-scars conform to the two types, as already indicated. If then the form of the leaf-scar is of generic value in *Lepidodendron* and *Sigillaria*—and I think most Botanists will agree in the importance of this character—on what grounds can we ignore the value of the same character in *Ulodendron?* Therefore, if those species with Ulodendroid-scars are to be excluded from *Lepidodendron* and *Sigillaria*, it will be necessary to form two genera for these plants—one for Lepidodendroid-Ulodendra, and the other for Sigillarian-Ulodendra. This view, however, I am not prepared to adopt, as I think the plants find a suitable and natural place in *Lepidodendron* and *Sigillaria* respectively.

This subject I intend to enter into more fully at a future time, when I hope to figure some specimens on which the above views have been founded.

Under *Lepidodendron Veltheimianum*, Stur, in his Culm Flora, has in error included on pl. xxxix. figs. 1*a*, *b*, and 2, two figures of *Sigillaria Taylori*, Carruthers, sp. Both of these figures are exquisite examples of old stems of the plant described as *Ulodendron Taylori* by Mr. Carruthers (Monthly Micros. Journal, p. 152, pl. xliii. fig. 1, March 1870). Mr. Carruthers' specimen does not, unfortunately, show clearly the form of the leaf-scar.

Lepidodendron acuminatum is only a varietal form of *Lepidodendron Veltheimianum*, with which it has already been united by Schimper. *Lepidodendron geniculatum* is also merely a form of the same species. *Lepidodendron patens* (*Selaginites patens*), Brongniart, from the neighbourhood of Edinburgh, is likewise to be referred to *Lepidodendron Veltheimianum*. The peculiar appearance of this fossil is caused by the basal portions of the leaves still retaining their attachment to the stem, and in other cases I have observed a very similar appearance produced by the leaves being addressed (probably through mechanical agency) to the branches.

Although not in doubt for a moment that those specimens to which I refer are similar to that figured in vol. ii. pl. xxvi. of the Hist. d. Végét. Foss., examples with such an extremely scaly appearance are rare; but I have one at least where it is as well marked as on the type figure of *Lepidodendron patens*, Brongt., sp.

Schmalhausen has united *Lepidodendron Glincanum*, Eichwald, and *Lepidodendron Volkmannianum*, Sternberg, with *Lepidodendron Veltheimianum*, Sternberg.* In regard to *Lepidodendron Glincanum*, I cannot find any point by which it can be distinguished from *Lepidodendron Veltheimianum*, and therefore include it under that name; but *Lepidodendron Volkmannianum* seems an altogether distinct species, and cannot be united with *Lepidodendron Veltheimianum*.

Lepidodendron (*Sagenaria*) *Glincanum*, Eichwald (Lethæa Rossica, pl. v*a*, fig. 7), should perhaps be referred to *Lepidodendron Volkmannianum*.

Lepidodendron (*Sagenaria*) *aculeatum*, Feistmantel and Göppert (l.c.), *Lepidodendron selaginoides*, *Lepidodendron Sternbergii*, Heer (l.c.), and *Sagenaria*

* Mem. l'Acad. d. Sc. de Pétersbourg, vii^e^ sér. vol. xxxi. No. 13, p. 11.

caudata, Geinitz and Römer (l.c.), are all, I believe, referable to *Lepidodendron Veltheimianum*.

Lepidodendron Jaschei and *Lepidodendron gracile*, Römer (Palaeontographica, vol. xiii. pl. xxxv. figs. 6, 7), are both young conditions of *Lepidodendron Veltheimianum*. Similar transverse bars to those occurring on the leaf-scars of *Lepidodendron gracile* have already been referred to in the case of *Lepidodendron rugosum*.*

Bergeria regularis and *Bergeria alternans*, Schmalhausen (l.c.), appear to be only different conditions of preservation of *Lepidodendron Veltheimianum*.

The core of an impression of *Lepidodendron Veltheimianum* in my own Collection agrees so entirely with *Knorria acicularis* that I have no hesitation in also referring that fossil to this species. The explanation of how this fossil is formed will be learnt from an examination of the internal structure of *Lepidodendron*. As far as the present example of *Knorria acicularis* is concerned, the more delicate tissue surrounding the central vascular bundle appears to have decayed, and the bundle thus freed has probably floated out of the cortical cylinder, which subsequently became filled with sediment. Pressure then acting on the cortical cylinder has forced the mud which filled its interior up the small channels through which the foliar vascular bundles pass to the leaves; the bark next appears to have decayed, leaving the impression of its outer surface on the surrounding matrix. The preservation of the casts of the vascular bundle channels has been assisted by the decayed bark remaining around them in the form of a fine powder, and so helping to prevent their obliteration by subsequent pressure or infiltration. In this manner are formed the little acicular points (the casts of the channels through which the foliar vascular bundles passed) which characterise *Knorria acicularis*, Göppert.

Some specimens of *Knorria imbricata* appear to be formed by a partial decay of the outer surface of the bark of *Lepidodendron* before fossilisation takes place. It is impossible to correlate the various named species of *Knorria* with the plants to which they really belong, as any species of *Lepidodendron* might produce one or more so-called species of *Knorria*, according to the amount of decay that had taken place in the plant and the conditions that had attended its mineralisation.

Lepidophloios and the Clathrarian-Sigillaria might also form Knorria-like fossils.

The type of *Flemingites Pedroanus*, Carruthers, is in the Collection. I have failed to see any character in which it differs from *Lepidodendron Veltheimianum*.

The figure given by Mr. T. Allan (Trans. Roy. Soc. Edinburgh, vol. ix. pl. xiv.), of a "Vegetable Impression found in the Quarry of Craigleith," is a good example of *Lepidodendron Veltheimianum* showing the Ulodendroid-scars. This example was subsequentiy named *Ulodendron Allani* by Buckland, and *Lepidodendron ornatissimum* by Brongniart. Lindley and Hutton mention Allan's figure as synonymous with their *Ulodendron minus*, but this appears to be a mistake, for Allan's specimen shows the Lepidodendroid leaf-scar, whereas Lindley and Hutton's plant belongs to the Sigillarian section of *Ulodendron*.

The plate of *Ulodendron minus*, L. and H., does not at first lead one to this view, but from an examination of the counterpart of their fossil, all which is now preserved of their type,† I have been led to this conclusion. *Ulodendron majus*, L. and H., is only an older and larger example of their *Ulodendron minus*; hence its supposed identity with Rhodes' pl. iii. fig. 1, is also erroneous. *Lepidodendron ornatissimum* and Rhodes' pl. iii. figs. 1–8 are referable to *Lepidodendron Veltheimianum*.

Here must likewise be placed Eichwald's figures of *Ulodendron ellipticum*,

* See note under *Lepidodendron Sternbergii*, ante, p. 152.

† In the "Hutton Collection," Newcastle-on-Tyne.

which all appear to be more or less imperfectly preserved specimens of *Lepidodendron Veltheimianum;* that on his pl. x. fig. 6 (l.c.), in addition to exhibiting the leaf-scars of this *Lepidodendron*, shows also on other parts of the same fossil scars so preserved that they might be named with all propriety "*Knorria.*" It is questionable, however, if most of the other figures which by different authors have been referred to *Ulodendron ellipticum* really belong to this plant.

Ulodendron transversum, Eichwald (Lethæa Rossica, pl. ix. fig. 8), is another example, and a very interesting one, of the Ulodendroid condition of *Lepidodendron Veltheimianum.* On this specimen are shown the characteristic Lepidodendroid leaf-scars, a *Knorria* condition, a decorticated state of the stem, and finally the large Ulodendroid-scar. Eichwald's fig. 13, pl. vi., probably belongs to this species too, but the actual proof that it does so is not shown on the figure, which is merely a *Knorria* condition of *Lepidodendron.*

Similar remarks to those just made on Eichwald's, fig. 8, pl. ix. may also be applied to his *Ulodendron pumilum* (pl. x. fig. 5). The large Ulodendroid-scar appears to have been partly covered by the matrix, and consequently looks smaller than in some other examples, but does not seem to be specifically distinct from them. It is identical with his *Ulodendron transversum*, with which the leaf-scars agree in all particulars.

It is probable that the *Ptychopteris microdiscus* of the same author is only a badly-preserved specimen of *Lepidodendron Veltheimianum.* There is little evidence to support the view that this fossil is a fern stem.

Under *Pachyphlæus tetragonus*, Göppert* appears to have included portions of different plants. His fig. 5 cannot be distinguished from a Ulodendroid-scar of *Lepidodendron Veltheimianum*, but his other figures do not seem to belong to this plant.

Some authors have proposed the union of *Lepidodendron corrugatum*, Dawson, with *Lepidodendron Veltheimianum;* and "so closely indeed does the last species resemble *Lepidodendron corrugatum*, that Schimper and other European palæobotanists conversant with the protean forms of these species, and knowing ours only by imperfect figures, may well be excused for regarding them as identical."†

As mentioned in the above quotation, some figures of *Lepidodendron corrugatum* are scarcely distinguishable from *Lepidodendron Veltheimianum*, but through the kindness of Sir J. W. Dawson, who has forwarded me a series of specimens representing his plant at different ages of growth, I have been enabled to compare them with well-preserved examples of *Lepidodendron Veltheimianum*, and feel convinced that the latter and *Lepidodendron corrugatum* cannot be united.

Horizons.—Carboniferous Limestone Series, and Calciferous Sandstone Series.

Localities.—British. Lanarkshire : Carluke (Carb. Lime. Series). Midlothian : Burdiehouse, near Edinburgh ; Juniper Green, near Edinburgh (Calcif. Sandstone Series).

Foreign. Silesia : Waldenburg (Culm). Brazil (*Flemingites Pedroanus*) : Rio Grande do Sol (Carboniferous).

Lepidodendron Harcourtii, Witham.

Lepidodendron Harcourtii.

Binney, Obs. Structure Foss. Plants Carb. Strata, part ii. 1871, p. 46, pl. vii. figs. 1–10 ; 1872, p. 80, pl. xiv. figs. 1–3.

Bronn, Lethæa Geog. vol. i. part ii. p. 127, pl. vi[1]. fig. 5.

Carruthers, Quart. Journ. Geol. Soc. vol. xxv. p. 251, pl. x. fig. 8.

Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 162.

* Syst. Fil. Foss. p. 468, pl. xliii.

† Dawson, Foss. Plants Lower Carb. Canada, p. 21.

Dawson, Canadian Nat. vol. viii. p. 451.
Lindley and Hutton, Foss. Flora, vol. ii. pls. xcviii. xcix.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. 1882, p. 26, pl. iv.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 36.
Williamson, Phil. Trans. 1872, p. 205.
Witham, Trans. Nat. Hist. Soc. Northumberland, Durham and Newcastle-on-Tyne, vol. ii. p. 236, pls. v. vi. 1838.
„ Internal Structure of Fossil Vegetables, p, 51, pl. xii. xiii.
Unger, Synop. Plant. Foss. p. 132.
„ Genera et Species, p. 259.

Lepidodendron vasculare.
Binney, Obs. Structure Foss. Plants Carb. Strata, part ii. p. 48, pl. viii. figs. 1–5 and 7–9, 1871.

Sigillaria vascularis.
Binney, Obs. Structure Foss. Plants Carb. Strata, part ii. p. 81, pl. xiv. figs. 4–6.

Phillipsia Harcourti.
Bronn, Index Palæont. p. 958.

Remarks.—Under this name are included some microscopic sections of *Lepidodendra*, showing structure similar to that described by Witham, and Lindley and Hutton.

Lepidodendron Veltheimianum possesses an internal structure which agrees in all points with *Lepidodendron Harcourtii*, but it is not safe to conclude that all Lepidodendroid stems which agree in this character belong to one and the same species. The outer surface of the specimen figured by Witham, and Lindley and Hutton gives no clue as to the species to which their fossil belonged, as it merely represents a *Knorria* condition of a Lepidodendroid branch.

Horizons.—Coal Measures and Calciferous Sandstone Series.
Localities.—British. Buteshire: Laggan Bay; Arran. Midlothian: Craigleith Quarry. Edinburgh (Calciferous Sandstone Series). Yorkshire: Oldham (Coal Measures).

LEPIDOPHLOIOS, Sternberg, 1825.

Versuch eines geognostisch-botanischen Darstellung der Flora der Vorwelt, vol. i. fasc. iv. p. 13.

Lepidophloios laricinus, Sternberg.

Lepidophloios laricinus.
Boulay, Terr. Houil. du Nord de la France, p. 38.
Bronn, Index Palæont. p. 631.
Ettingshausen, Steinkf. v. Radnitz, p. 57.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Der Hangendflötzzug, p. 86.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Giebel, Deutschl. Petrefacten, p. 87.
Goldenberg, Flora Saræp. Foss. heft i. p. 22, pl. iii. fig. 14 (fig. 13?), heft iii. p. 30, pl. xv. figs. 5–8, 11–20, pl. xvi. figs. 1–13.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 142.
Heer, Flora Foss. Helv. lief. i. p. 40.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 440.
„ Coal Flora of Pennsyl. p. 442.
Renault, Cours d. Botan. Foss. 1882, p. 44, pl. ix. figs. 1 and 5–8.

Roehl, Foss. Flora d. Steink. Form. Westph. p. 150, pl. xiii. fig. 1, pl. xxviii. fig. 8 (excl. fig. 9, Syn. in part).
Schimper, Traité d. Paléont. Végét. vol. ii. p. 51, pl. lix. fig. 4 (excl. pl. lx. figs. 11, 12 = *Lepidophloios carinatus*, Weiss).
Sternberg, Vers. i. fasc. iv. p. xiii.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.
Unger, Synop. Plant. Foss. p. 144.
„ Genera et Species, p. 278.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 90, 1868.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 154, pl. xv. figs. 6, 7, 9.
Zeiller, Végét. Foss. du Terr. Houil. p. 113, pl. clxxii. figs. 5, 6.

Lepidodendron laricinum.
Brongniart, Prodrome, p. 86.
Feistmantel, Steinkf. v. Kralup in Böhm. pp. 13 and 26, pls. ii. iii.
„ Vers. d. Böhm. Kohlenab. p. 191, pls. xxxiii. xxxiv. figs. 1–5 (? excl. syn. *Lomatophloios crassicaule*).
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 299.
„ Steinkohl. u. Perm.-Ablager. p. 89.
Geinitz, Flora d. Hainich.-Ebersdorfer, pp. 17 and 47, pl. xi. figs. 4–7.
Sternberg, Vers. i. fasc. i. p. 23, pl. xi. figs. 2–4.

Lepidophloios Acadianus.
Dawson, Acadian Geol. 2nd ed. p. 489, fig. 171, 1868.
„ Geol. Survey of Canada, Reports, 1874–5, p. 192.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 163, pl. x. fig. 45.
„ Canadian Nat. vol. viii. p. 452.
„ Foss. Plants, Lower Carb. Canada, pp. 33 and 37, pl. ix. fig. 85.

? Lepidophloios acuminatus.
Weiss, Foss. Flora d. jüng. Steink. u. Rothl. p. 155, pl. xv. fig. 8.

Lepidophloios obcordatus.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 457, pl. xli. fig. 2, (excl. fig. 1).
„ (*in part*), Coal Flora of Pennsyl. p. 423.

Lepidophloios geminum.
Goldenberg, Flora Saræp. Foss. pl. xv. fig. 14.

Sigillaria dubia.
Goldenberg, Flora Saræp. Foss. pl. vii. fig. 12.

Sigillaria Menardi.
Goldenberg, Flora Saræp. Foss. pl. vii. fig. 1 (figure inverted).

Halonia tuberculata.
Eichwald, Lethæa Rossica, vol. i. p. 148, pl. xi.

Halonia.
Carruthers, Geol. Mag. vol. x. p. 145, pl. vii., 1873 (excl. fig. p. 151, *H. gracilis*).

(*?*) *Ulodendron tumidum.*
Carruthers, Monthly Micro. Journ. p. 154, pl. xliii. figs. 5–7, 1870.

Remarks.—It has been shown by Feistmantel, in his Steinkohlen-Flora von Kralup in Böhmen,* that *Halonia*, Lindley and Hutton, is only a fruiting branch of *Lepidophloios laricinus*, Sternberg, and later the same relationship of *Halonia* to *Lepidophloios* has been further explained by Dr. Macfarlane (Trans. Bot. Soc. Edinb. vol. xiv. p. 181, pls. vii. viii.†). These figures

* Abhandl. der k. Böhm. Gesellschaft der Wissensch. vi. Folge. vol. v. 1871.
† Dr. Macfarlane's *Lepidophloios* is not *L. laricinus*, Sternberg, but a new species, for which I propose the name of *Lepidophloios Scoticus*.

alone, one would think, were sufficient to place the affinities of *Halonia* outside the circle of discussion, but notwithstanding the conclusive evidence they afford on this point, the view held by these writers has not been universally accepted.*

Mr. Carruthers has also figured a specimen of *Halonia* attached to *Lepidophloios*,† which is in the Collection. The conclusion arrived at by him was very similar to that mentioned by Feistmantel, that *Halonia* was only a condition of *Lepidophloios*. Both on the Halonian-branch and the main stem of this example some of the characteristic leaf-scars of *Lepidophloios* are shown. Those on the *Halonia* portion are normal in form and point downwards, but on the main stem from some cause, perhaps pressure or distortion during or after mineralisation, the leaf-scars are arranged at right angles to the direction they ordinarily hold on the stem; hence the two lateral angles of the leaf-scar lie parallel to the direction of growth, and the scar of the vascular bundle so twisted round, and occupies one of the lateral angles.

In his last memoir on the "Organisation of Fossil Plants of the Coal Measures,"‡ Dr. Williamson gives a figure (pl. xxxiv.) of *Halonia* attached to a Lycopodiaceous stem. He says,§ "In my second memoir (Phil. Trans. 1872, p. 222), read in June, 1871, I said, 'I have little doubt but that *Halonia* was a fruiting branch of a *Lepidodendron*;' and in a note added in April, 1872, I affirmed *absolutely*, 'First, that *Halonia* belongs to the upper branches, of a Lepidodendroid tree, consequently it cannot be a root;' 'secondly, we learn that *Halonia* is a specialised branch of a Lepidodendroid tree that is not itself a *Halonia*.'" . . . "The specimen now described is unquestionably not a *Lomatophloios*, but a true *Lepidodendron*." In describing his specimen, he says further (p. 468), that at the lower portion of the branch the leaf-scars have exactly the same form as those of *L. selaginoides* and *L. elegans*, Lindley and Hutton. I have already mentioned that the leaf-scars on the specimen described by Mr. Carruthers are so turned round on the stem that instead of their greater diameter being transverse to the stem, as is normally the case in *Lepidophloios*, it is vertical. Dr. Williamson's figure does not show clearly the form of the scars further than that the vertical diameter of those on the lower part of the stem seems greater than their transverse breadth. The leaf-scars towards the upper portions of the specimen are rhomboidal. I am inclined to think there is here a case of distorted leaf-scars on the lower part of the fossil, similar to that occurring in Mr. Carruthers' specimen, where, notwithstanding this peculiarity, the fossil is clearly identifiable as *Lepidophloios laricinus*.

With such an imperfectly preserved example as Dr. Williamson's appears to be, any conclusion derived from it is of doubtful value, and though from an examination of his plate one cannot affirm his fossil is a *Lepidophloios*, equally one cannot say it is a *Lepidodendron*.

The figures given by Feistmantel and Dr. Macfarlane are conclusively affirmative that at least some *Halonia* specimens belong to *Lepidophloios*, whereas we have no example which shows in an undoubted manner that any *Halonia* fossil can be referred to *Lepidodendron*. My own opinion is that *Halonia* is exclusively related to *Lepidophloios* as its fruiting branch. Of course, those authors who place *Lepidophloios laricinus*, Sternberg, in *Lepidodendron*, may consistently say that *Halonia* is the fruiting branch of *Lepidodendron*, but I am not aware that any recent writer has followed this classification.

Lepidophloios and *Lepidodendron* I regard as essentially distinct genera. *Lomatophloios* is now united with *Lepidophloios*, hence I understand

* See Renault, Cours d. Bot. Foss. p. 53, 1882.
† Geol. Mag. vol. x. April, 1873.
‡ Phil Trans. 1883, clxxiv. p. 459.
§ *l. c.* p. 469.

Dr. Williamson's statement that "The specimen now described is unquestionably not a *Lomatophloios*, but a true *Lepidodendron*, which is equivalent to saying that it is not a *Lepidophloios* but a *Lepidodendron*."

Sigillaria Menardi, Goldenberg (Flora Saræp. Foss. pl. vii. fig. 1), appears to be referable to *L. laricinus*. The central point of the leaf-scars of this figure is probably the tubercle with which the leaf supporting pedicels of this plant are frequently provided, as pointed out by Weiss.* *U. tumidum*, Carr., the type of which is in the Collection, is, I think, also referable to *L. laricinus*. The leaf-scars are not well preserved on his type, but it probably finds its place here. It is not, at any rate, a *Ulodendron* as defined by Lindley and Hutton, for it shows more than two rows of the larger scars on the circumference of the stem, a third row appearing on the side not shown in Mr. Carruthers' figure.

Halonia tuberculata, Eichwald (Lethæa Rossica, vol. i. p. 148, pl. xi.), is another instructive example as illustrating the affinities of *Halonia*. The core out of this specimen is a typical *Halonia*, the impression *Lepidophloios*. In such examples as these a layer of cortical tissue from between the core and the impression has evidently been removed by decay, after the cortical cylinder had been filled with sediment and the impression of the outer surface of the bark had been imparted to the surrounding matrix. An example in the Collection shows the same conditions—a removable *Halonia* core from a *Lepidophloios* impression.

The plant figured as *Knorria Sellonii*, by Lindley and Hutton (Fossil Flora, vol. ii. pl. xcvii.), appears to be a compressed specimen of *Lepidophloios*. I have examined this type in the "Hutton Collection," of which their plate does not give a very correct idea.

I am unable to discover from what evidence Renault has restored his *Lepidophloios*, as represented in his Cours d. Botan. Foss. 1882, pl. xi. fig. 1. It appears to possess the large scars of one genus and the leaf-scars of another.

Horizon.—Coal Measures.

Localities.—*British.* Staffordshire: Ipstones.

Foreign. Bohemia: Radnitz. Silesia: Waldenburg.

Lepidophloios carinatus, Weiss.

Lepidophloios carinatus.
Weiss, Foss. Flora d. jüng. Steink. u. d. Roth. p. 155.

Lepidophloios laricinus.
Goldenberg, Flora Saræp. Foss. heft iii. p. 45, pl. xv. fig. 9 (named on plate, *Lepidophloios macrolepidotus*).
Schimper (*in part*), Traité d. Paléont. Végét. pl. lx. figs. 11, 12.

Lepidodendron brevifolium.
Ettingshausen, Steinkf. v. Radnitz, p. 53, pl. xxiv. figs. 4, 5, pls. xxv. xxvi. fig. 3.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 22.

Lepidodendron acerosum.
Lindley and Hutton, Foss Flora, vol. i. pl. vii. fig. 1, and pl. viii.

Lepidostrobus pinaster.
Fiedler, Die Foss. Fruchte, p. 270.
Lindley and Hutton, Foss. Flora, vol. iii. pl. cxcviii.
Unger, Synop. Plant. Foss. p. 139
„ Genera et Species, p. 270.

? Lepidodendron longifolium.
Schimper (*in part*), Traité d. Paléont. Végét. pl. lix. fig. 1.

* Flora d. jüng. Stk. u. d. Rothl. p. 155.

? Lepidodendron dichotomum.

Feistmantel (*in part*), Vers. d. Böhm. Kohlenab. p. 188, pl. xxxii. figs. 1, 3, 5.

Roehl (*in part*), Foss. Flora d. Steink.-Form. Westph. p. 125, pl. xi. fig. 2.

Remarks.—I have examined the specimens named *Lepidodendron acerosum* in the "Hutton Collection," and find they are the *Lepidophloios carinatus*, Weiss. To this species is also to be referred *Lepidostrobus pinaster*, Lindley and Hutton. This type is preserved at Newcastle-on-Tyne, and is merely a small fragment of the bark of *Lepidophloios carinatus*. The leaf-like prolongations which are represented as springing from the scales of the supposed cone are not organic structures but cracks in the matrix. The cone-like form of the fossil is also more marked in the drawing than on the original. In the plate the leaf-scales are however drawn in their true position, the articulating surface being directed downwards in *Lepidophloios*.

Pinus anthracia, Lindley and Hutton (Fossil Flora, vol. iii. pl. clxiv.), is likewise a fragment of the bark of *Lepidophloios*. The specimen being badly preserved cannot be definitely referred to any species, but is probably only an older condition of *Lepidophloios carinatus*, Weiss.

The example in the Collection from Jarrow shows a cone attached to the stem.

Horizon.—Coal Measures.

Localities.—*British.* Durham : Jarrow. Stirlingshire : No. 1 Pit, Railway Station, Falkirk ?

Foreign. Bohemia : Kralup.

Lepidophloios Scoticus, Kidston, n.s.

Lepidophloios laricinus.

Macfarlane, Trans. Botan. Soc. Edinb. vol. xiv. p. 181, pls. vii. viii. (excl. fig. 5*a*).

Halonia.

Thompson, Trans. Geol. Soc. Edinb. vol. iii. p. 341, pl. (? A), fig. 1.

Remarks.—This species has been figured and described by Dr. Macfarlane under the name of *Lepidophloios laricinus*, Sternberg, from which, however, it is essentially distinct. His description is very full, so nothing further need be added here. Reference has already been to made to Dr. Macfarlane's figures in regard to the relationship of *Halonia* to *Lepidophloios* (see *ante*, p. 170).

Horizon.—Calciferous Sandstone Series (Culm.).

Locality.—*British.* Midlothian : Burdiehouse, near Edinburgh.

HALONIA, Lindley and Hutton, 1833.

Fossil Flora of Great Britain, vol. ii. p. 11.

Obs.—The genus *Halonia*, as employed here, is synonymous with "fruiting branch of *Lepidophloios*," and is not regarded as constituting a true group of plants. Halonian branches of *Lepidophloios*, which cannot be specifically distinguished, are often met with, and for the purpose of noting the occurrence of the genus these specimens must not be passed over.

The genus *Cyclocladia*, Goldenberg* (non Lindley and Hutton),† is also to be referred to *Lepidophloios*. The original figure given by Goldenburg is only a flattened impression of *Halonia*.‡

* Flora Saræp. Foss. heft i. pp. 19, 20, pl. iii. fig. 11.

† *Cyclocladia*, Lindley and Hutton (Foss. Flora, vol. ii. pl. cxxx.), is to be referred to *Calamitina*, Weiss (Steinkohlen-Calamarien, p. 126, Abhand. z. Geol. Specialkarte v. Preussen u. d. Thüringischen Staaten, vol. ii. heft i. 1876).

‡ Carruthers, Geol. Mag. vol. x. p. 145, 1873.

In unison with this view I give the following references :—

Halonia regularis.
Binney, Obs. Structure Foss. Plants Carb. Strata, part iii. p. 89, pl. xv. figs. 1–4, pl. xvi. figs. 1–5, 1872.
Feistmantel, Steink. v. Kralup in Böhm. pl. xvii. figs. 1–5, pl. xviii.
„ Vers. d. Böhm. Kohlenab. p. 193, pl. xxxiv., fig. 6, pl. xxxv., pl. xxxvi. figs. 1, 2, and pl. xxxvii. figs. 1, 2).
Lindley and Hutton, Foss. Flora, vol. iii. pl. ccxxviii.
Renault, Cours d. Botan. Foss. 1882, p. 42.
Unger, Synop. Plant. Foss. p. 137.
„ Genera et Species, p. 267.

Halonia tuberculata.
Göppert, Foss. Flora d. Ubergangs. p. 194, pl. xxviii. fig. 8
Renault, Cours d. Botan. Foss. 1882, p. 53, pl. xii. fig. 3.

Haloniatortuosa.
Boulay, Terr. Houil. du Nord. de la France, p. 39.
Lindley and Hutton, Foss. Flora, vol. ii. pl. lxxxv.
Renault, Cours d. Botan. Foss. 1882 p. 54, pl. xii. fig. 4.

Halonia gracilis.
Lindley and Hutton, Fossil Flora, vol. ii. pl. lxxxvi.
See also Schimper, Traité d. Paléont. Végét. vol. ii. p. 53.
A number of examples of Halonian branches of *Lepidophloios* are in the collection.

Localities.—British. Durham : Gateshead. Northumberland : Newcastle-on-Tyne. Shropshire : Coalbrook-Dale. Worcestershire : near Bewdley. Yorkshire : Bradford ; Hifftree Quarry, Leeds.

KNORRIA, Sternberg.

I have already mentioned my reasons for rejecting this genus.* The plants for which it was formed are merely imperfectly preserved examples of *Lepidodendron*, and perhaps also individuals of other genera.
The Collection contains many examples of these fossils.

SIGILLARIA, Brongniart, 1822.

Sur la classification des Végétaux fossiles, p. 9.

SECTION CLATHRARIÆ.

Sigillaria discophora, König, sp.

Lepidodendron discophorum.
Bronn, Index Palæont. p. 650.
König, Icones Fossilium Sectiles, pl. xvi. fig. 194, 1825.

Ulodendron majus.
Bronn, Index Palæont. p. 1341.
Carruthers, Monthly Micro. Journ. vol. iii. p. 153, pl. xliii. fig. 4, 1870.
Giebel, Deutschl. Petrefacten, p. 82.
Goldenberg, Flora Saræp. Foss. heft i. p. 18.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 435.
„ Geol. of Pennsyl. vol. ii. p. 875.
„ Coal Flora of Pennsyl. p. 401 (? pl. lxvi. figs. 3, 3[a]) (excl. ref. *Steinhauer*).
Lindley and Hutton, Foss. Flora, vol. i. pl. v. (excl. ref.).

* See *ante*, p. 167.

Renault, Cours d. Botan. Foss. 1882, p. 50, pl. xi. fig. 3.
Roehl, Foss. Flora d. Steinkf.-Form. Westph. p. 138.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 41 (syn. and ref., *in part*).
Sternberg, Vers. ii. p. 185.
Unger, Genera et Species, p. 263.

Ulodendron minus.
Bronn, Index Palæont. p. 1341.
Carruthers, Monthly Micro. Journ. vol. ii. p. 225, pl. xxxi., 1869, vol. iii. p. 153, 1870.
Eichwald, Urwelt Russlands, heft i. p. 82.
Giebel, Deutschl. Petrefacten, p. 82 (excl. syn.).
Goldenberg, Flora Saræp. Foss. heft i. p. 18.
Lindley and Hutton, Foss. Flora, vol. i. pl. iv. (excl. ref.).
Lesquereux, Coal Flora of Pennsyl. p. 403 (? pl. lxvi. fig. 1).
Renault, Cours d. Botan. Foss. 1882, p. 50. pl. xi. fig. 2.
Roehl, Foss. Flora d. Steink.-Form. Westph. p. 139 (excl. syn.).
Schimper, Traité d. Paléont. Végét. vol. ii. p. 42 (syn. in part).
Sternberg, Vers. ii. p. 185, pl. xlv. fig. 5.
Unger, Genera et Species, p. 263 (excl. ref., Allan and Brongt.).
Zeiller, Végét. Foss. du Terr. Houil. p. 115.

Bothrodendron punctatum.
Bronn, Index Palæont. p. 173.
Goldenberg, Flora Saræp. Foss. heft i. p. 18.
Lindley and Hutton, Foss. Flora, vol. ii. pls. lxxx. lxxxi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Renault, Cours d. Botan. Foss. 1882, p. 52, pl. xi. fig. 4.

Ulodendron punctatum.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 42.

Ulodendron Lindleyanum.
Lesquereux, Geol. of Pennsyl. p. 875, 1858.
Sternberg, Vers. ii. p. 185, pl. xlv. fig. 4.
Unger, Synop. Plant. Foss. p. 135.
„ Genera et Species, p. 263.

Ulodendron ellipticum.
Roehl, Foss. Flora d. Steink.-Form. Westph. p. 139, pl. xxiii. fig. 3 (? 4).

Ulodendron Stockesii.
Buckland, Geol. and Mineral. vol. ii. p. 93, pl. lvi. fig. 5.
Carruthers, Monthly Micro. Journ. vol. iii. p. 152, pl. xliv. fig. 3, 1870.

? Ulodendron Conybearii.
Buckland, Geol. and Mineral. vol. ii. p. 94, pl. lvi. fig. 6[1].

? Ulodendron transversum.
Carruthers, Monthly Micro. Journ. vol. iii. p. 153, pl. xliv. fig. 2, 1870.

Ulodendron pumilum.
Carruthers, Monthly Micro. Journ. vol. iii. p. 152, pl. xliii. fig. 2.

Ulodendron Lucasii.
Buckland, Geol. and Mineral. vol. ii. p. 93, pl. lvi. fig. 4.

Lepidophloios parvus.
Dawson, Acadian Geol. 2nd ed. p. 490, fig. 170*g*, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 163, pl. xi. fig. 50, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 453.
„ Foss. Plants Lower Carb. Canada, p. 38.

Lepidophloios tetragonus.
Dawson, Acadian Geol. 2nd ed. p. 490, fig. 170*d*, 1868.

Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 164.
" Canadian Nat. vol. viii. p. 453.
" Foss. Plants Lower Carb. Canada, p. 37.

Lepidodendron salebrosum
Wood, Trans. Amer. Phil. Soc. vol. xiii. p. 345, pl. viii. fig. 6.

Halonia disticha.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489, pl. xxxviii. fig. 1.

Sigillaria Preuiana.
Römer, Palaeontographica, vol. ix. p. 42, pl. xii. fig. 7, 1862.

Sigillaria perplexa.
Wood, Trans. Amer. Phil. Soc. vol. xiii. p. 345, pl. viii. fig. 7.

Sigillaria Menardi.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 450, pl. xliii.

Remarks.—In the notes appended to *Lepidodendron Veltheimianum*, Sternb., my reasons are stated fully for regarding certain species of *Ulodendron* as *Sigillaria*. The two species of *Ulodendron* (as far as specimens in the Collection are concerned) which fall to be placed in *Sigillaria* are *Lepidodendron discophorum*, König (= *Ulodendron majus*, L. and H.), and *Ulodendron Taylori*, Carruthers. At present my remarks will apply chiefly to *Sigillaria discophora*, König, sp.

This species was first figured as a *Lepidodendron*, without any description, by König, about 1825. As far as I am aware, Bronn is the only author who takes any notice of König's plate, which is very characteristic of the species. His figure, of which there is a plaster cast in the Collection, represents a specimen 6½ inches long and 3 inches wide, bearing two perfect Ulodendroid-scars and a portion of a third. These are about 2 inches in diameter. The rhomboidal leaf-scars are seen on the figure, and a separate drawing of them is also given, but they show no trace of the vascular bundle "dots." Lindley and Hutton's *Ulodendron majus* agrees in all respects with this figure, which evidently must have been unknown to the authors of the Fossil Flora, as they make no reference to it. In regard to Lindley and Hutton's plate, the leaf-scars appear to be a little roughly drawn, their upper angle being too acute, and the boundary lines of the lower portion of the leaf-scar too convex. Their reference to Rhode's plate must be excluded, as Rhode's figure belongs to *Lepidodendron Veltheimianum*, and not to their *Ulodendron majus*.

From the examination of numerous specimens, many of which were in exquisite preservation, I can entertain no doubt that *Ulodendron minus*, L. and H., is only a slightly younger stem of *Ulodendron majus*, L. and H. The reference they give to Allan's plate of a *Ulodendron* from Craigleith Quarry as synonymous with their *Ulodendron minus* must also be cancelled, as Allan's plant is likewise *Lepidodendron Veltheimianum*. I have carefully examined the counterpart of the type of *Ulodendron minus*, L. and H., which is now all that is known to exist of the fossil, and am assured by the shape of the leaf-scars that it is Sigillarian, they being, in fact, of the same form as that described by Römer as *Sigillaria Preuiana*, but this point will be more fully discussed presently.

The figure of *Ulodendron minus*, given by Lesquereux in the Coal Flora of Pennsylvania, and which appears to be inverted, is not very satisfactory, but is probably Lindley and Hutton's plant.

The same author gives an excellent figure of *Sigillaria discophora*, König., sp. (Report, Geol. Survey of Illinois, vol. ii. p. 450, pl. xliii.), under the name of *Sigillaria Menardi*, where the character of the leaf-scar is clearly shown. The specimen he figures is a comparatively old stem, and is very characteristic of the species. In fact, Lesquereux here notices the Sigillarian nature of his fossil, and places it in the correct genus, but perhaps not under the right species, though I am by no means sure that *Sigillaria*

Menardi, Brongniart (Hist. d. Végét. Foss. pl. clviii. fig. 5, not fig. 6), does not belong to *Sigillaria discophora*.

It is a little uncertain if the figures given as *Ulodendron majus* by Lesquereux (Coal Flora, pl. lxvi. figs. 3, 3*a*) belong to Lindley and Hutton's plant. The explanation of the figures is, I am afraid, inaccurate, if they belong to the species under which he has placed them. He appears to have under consideration two distinct plants. Perhaps his figure 3*a* is the *Bothrodendron punctatum*, Zeiller,* which is not, however, the *Bothrodendron punctatum*, Lindley and Hutton. The latter is only a decorticated state of their *Ulodendron majus* and *U. minus*.

The plant which Zeiller has figured and identified as Lindley and Hutton's *Bothrodendron punctatum* is a species closely allied to *Rhytidodendron minutifolium*, Boulay.† It is interesting to find the large Ulodendroid-scars also occurring in Boulay's genus *Rhytidodendron*. Zeiller has probably been misled in the identification of his fossil, by the authors of the Fossil Flora having headed their description of pl. lxxx. (*Bothrodendron punctatum*) "Corticated," and that of pl. lxxxi. "Decorticated." In their description of pl. lxxx. they say, "Upon the surface of the stem are discoverable a considerable number of minute dots, arranged in quincuncial manner, something less than half an inch apart; *it is probable that these may be the scars of leaves, but at present there is nothing to prove that they were so.*" (Vol. ii. p. 1.) It has since been proved that the little "dots," which were thought to be perhaps leaf-scars, are the extremities of the foliar vascular bundles, as exhibited on a decorticated stem. Their plate lxxxi. is only a more indifferently preserved example of the same plant, where all traces of the foliar vascular bundles have been entirely obliterated.

Ulodendron punctatum, Sternberg (Vers. ii. p. 186, pl. xlv. fig. 1). As this specimen is decorticated, it is impossible to determine the species to which it should be referred, though from the closeness of the foliar vascular bundles to each other it probably belongs to the Sigillarian group of *Ulodendron*.

Even in decorticated conditions of the so-called Ulodendrons, if the little "dots" of the foliar vascular bundles are shown, a probable determination can be made in many cases as to whether the specimen belongs to the Lepidodendroid or Sigillarian group of *Ulodendron*, for, on the Lepidodendroid members the leaf-scars are larger than on the Sigillarian, and consequently the foliar vascular bundle "dots" on decorticated stems of Sigillarian-Ulodendra stand nearer to each other than they do on Lepidodendroid-Ulodendra. This is not, however, in all cases a secure generic test, and in no case will it lead to a specific determination. When the little "dots" are not shown it is impossible even to say the genus to which a Ulodendroid fossil belongs.

Ulodendron ellipticum, Sternberg (Vers. ii. p. 186, pl. xlv. fig. 2), does not admit of any satisfactory allocation. *Ulodendron ellipticum*, Roehl (l.c. pl. xxiii. fig 3), appears to be referable to *Sigillaria discophora*, but his fig. 4 of the same plate is too indifferently preserved to speak of with any certainty. Neither can any definite identification be made of *Ulodendron Lindleyana*, Roehl (Foss. Flora d. Steink. Form. Westph. p. 138, pl. xxiii. figs. 1, 2).

Nor can one speak with more certainty as to the specific designation of *Ulodendron Schlegelii*, Eichswald (Lethæa Rossica, vol. i. p. 138, and Urwelt Russlands, heft i. p. 81, pl. iii. fig. 4). *Ulodendron transversum*, Carruthers (non Eichwald), (which does not appear to differ from *Ulodendron Schlegelii* and *Ulodendron Conybearii*, Buckland), is also probably to be referred to *Sigillaria discophora*. Of course, in discussing the nature of *Ulodendron*, absolutely nothing for the elucidation of its true affinities can be learnt from

* Ann. des Scienc. Nat. 6e sér. Bot. vol. xiii. p. 218, pl. ix. figs. 1–3, and Végét. Foss. du Terr. Houil. p. 116.

† Boulay, Terr. Houil. du Nord de la France et ses Végét. Foss. p. 39, pl. iii. figs. 1 and 1 *bis*.

such examples as those just mentioned, though, if at all possible, one is naturally anxious to correlate them to the species of which they are decorticated examples.

The small figure which Buckland gives of his *Ulodendron Lucasii* is not all that could be desired for a satisfactory determination, but from the form of the few leaf-scars, as shown on his figure, there is little reason to doubt that this species should also be placed under *Sigillaria discophora*.

I am unable to discover any point by which *Ulodendron pumilum*, Carruthers, can be distinguished from *Sigillaria discophora*. The specimen from which Mr. Carruthers' figure is taken is in the Collection, and shows very well the Sigillarian form of the leaf-scars. This fossil is somewhat smaller in all its parts than König's example, but this difference is entirely dependent on age. A figure agreeing in all essentials with that of Mr. Carruthers, and which I also refer to *Sigillaria discophora*, had previously been published by Dawson in his Acadian Geology (2nd ed. fig. 170*g*, p. 455, 1868) under the name of *Lepidophloios parvus*. What I believe to be only an older state of *Lepidophloios parvus* is the *Lepidophloios tetragonus*, Dawson (l.c., p. 455; Quart. Journ. Geol. Soc. vol. xxii. pl. x. fig. 49). On a large specimens of *Sigillaria discophora*, from the Coal Measures, Old Sauchie, Clackmannanshire, in my own Collection, some of the leaf-scars agree entirely with those of Dawson's *Lepidophloios tetragonus*.

Halonia disticha, Morris, must also be united with *Sigillaria discophora*. Specimens preserved in the round, similar to his figure, are by no means uncommon. The presence of only two rows of large scars on his fossil is sufficient to remove it from *Halonia* (*Lepidophloios*), and the other characters of the specimen show its true place to be here.

Geinitz (Vers. d. Steinkf. in Sachsen, p. 38) appears to have misunderstood the true nature of Lindley and Hutton's genus *Bothrodendron*, for under the name of *Halonia punctata* he includes different fossils.

Lepidodendron salebrosum and *Sigillaria perplexa*, Wood, are only fragments of *Sigillaria discophora*. Both in *Sigillaria perplexa* and in the figure given under the name of *Sigillaria Menardi* by Lesquereux, the longitudinal clefts which appear in the bark of old examples are well seen. A similar vertical splitting of the bark also takes place in the succeeding species (*Sigillaria Taylori*, Carruthers, sp.), and has already been pointed out as occurring in *Lepidodendron Veltheimianum* (=*Ulodendron parmatum* and *U. commutatum*).

One of the most interesting figures of this species has been given by Römer (Palaeontographica, vol. ix. pl. xii. fig. 7) under the name of *Sigillaria Preuiana*. He says of his plant (p. 42): "The leaf-cushions stand as in *Lepidodendron*, in oblique rows; they are rhomboidal or six-sided, as long as broad, slightly elevated, and show above the middle a round scar, on each side of which is a lunate cicatricule. The leaf-scar is almost as large as the leaf-cushion.

In other words, there is in *Sigillaria Preuiana*, which is synonymous with *Sigillaria discophora*, a Clathrarian-Sigillaria. In this section of *Sigillaria* the scars to which the leaves articulate are placed upon slightly elevated cushions, which in their structure are comparable to the cushions to which the leaves of *Lepidophloios* are attached. In the compressed condition these *Clathrarian-Sigillaria* might lead one to suppose that the vascular-scar was surrounded by a "field" as in *Lepidodendron*, but this appearance is altogether due to mechanical causes, and does not represent a parallel structure. In *Lepidodendron* the leaf base is not only attached to the vascular impression of the leaf-scar, but to the whole area of the "field." In *Sigillaria* the leaf is only attached to the vascular-scar, which is *not* surrounded by a "field."

I have seen many well-preserved specimens of *Sigillaria discophora*, with the leaf-scars identical with those described by Römer as occurring on his *Sigillaria Preuiana*, and were it not for the presence of the large Ulodendroid-scars on these specimens they could not have been distinguished from his plant. Hence, when *Sigillaria Preuiana* agrees in all its characters with undoubted

specimens of *Sigillaria discophora*, we have no course left but to unite the two. Portions of some of those examples of *Sigillaria discophora*, to which I have referred, might be broken off from those parts where the large scars do not occur, and would be indistinguishable from *Sigillaria Preuiana*, Römer.

Horizon.—Coal Measures.

Localities.—British. Lanarkshire : near Carluke (Presented by the British Association) ; Shott's Iron Works. Northumberland : Newcastle-on-Tyne—(Specimen figured as *Ulodendron Stockesii* by Mr. Carruthers, Monthly Micro. Journ. 1870, vol. iii. pl. xliv. fig. 3.) Staffordshire : Low Moor (Cast). Worcestershire : Bewdley. Yorkshire : Boldshaw, Bradford Moor, Bradford ; Wakefield. (No more definite locality than Yorkshire is given for the type of *Ulodendron pumilum*, Carruthers, Monthly Micro. Journ. 1870, vol. iii. pl. xliii. fig. 2.) No locality. Cast of *Sigillaria* (*Lepidodendron discophora*, König., sp., figured in Icones Fossilium Sectiles, pl. xvi. fig. 194).

Sigillaria Taylori, Carruthers, sp.

Ulodendron Taylori.
Carruthers, Monthly Micro. Journ. vol. iii. p. 152, pl. xliii. fig. 1, 1870.
Ulodendron minus.
Thompson, Trans. Edinb. Geol. Soc. vol. iii. p. 341, pl. (B).

Lepidodendron Veltheimianum.
Stur (*in part*), Culm Flora, heft 2, pl. xxxix. figs. 1, 2.

Remarks.—The form of the leaf-scars is not well shown on the type specimen of this species. They are better shown on the three other figures of this plant which have been given under the names of *Ulodendron minus* and *Lepidodendron Veltheimianum*. It is difficult to understand how Dr. Stur has included his two figures of *Sigillaria Taylori* under *Lepidodendron Veltheimianum*, as no state of preservation or age could account for the leaf-scars of *Lepidodendron Veltheimianum* becoming so altered as to assume the form and arrangement of those on his pl. xxxix. figs. 1, 2. His figure 1 shows an older condition of *Sigillaria Taylori* than his figure 2. The right hand upper corner of this last-mentioned figure indicates clearly the Sigillarian form of the leaf-scar, and how close are the affinities of this species with *Sigillaria discophora*. (Compare Mr. Carruthers' figure of this last-mentioned plant under the name of *Ulodendron pumilum*, Monthly Micro. Journ. vol. iii. pl. xliii. fig. 2.) Prof. D'Arcy Thompson has figured an example of this species with the lower portion of the appendicular organ attached. The Clathrarian form of the leaf-scars is well shown on his figure, but even better on his specimen, which he has kindly lent me for examination. I have already referred to an example collected by Dr. Macfarlane, which shows the appendicular organs, in a young condition, attached to the stem.*

Horizon.—Carboniferous Limestone Series. (Also occurs plentifully in the Calciferous Sandstone Series.)

Locality.—British. Linlithgowshire : Bathgate. (Type.)

Sigillaria Brardii, Brongniart.

Sigillaria Brardii.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 123.
Brongniart, Prodrome, p. 65.

* See *ante*, p. 164.

Brongniart, Hist. d. Végét. Foss. p. 430, pl. clviii. fig. 4.
Bronn, Index Palæont. p. 1143.
Feistmantel, Der Hangendflötzzug, p. 88, pl. v. figs. 1, 2.
Geinitz, Neues Jahrbuch, 1867, p. 284.
Germar, Vers. v. Wettin u. Löbejun, p. 29, pl. xi. figs. 1, 2.
Giebel, Deutschl. Petrefacten, p. 75.
Goldenberg, Flora Saræp. Foss. heft ii. p. 25, pl. vii. figs. 7–10.
Göppert, Foss. Flora d. Perm. Form. p. 201.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 154.
Heer, Flora Foss. Helv. lief. i. p. 42.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 872.
„ Report, Geol. Survey of Illinois, vol. ii. p. 451.
„ Coal Flora of Pennsyl. p. 477, pl. lxxiii. figs. 8–16.
Newberry, Ann. and Mag. Nat. Hist. 1883, vol. xii. p. 174.
Renault, Cours d. Botan. Foss. 1881, p. 129, pl. xvii. fig. 1.
Roehl, Vers. d. Steink. Form. Westph. p. 95.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 102.
Unger, Synop. Plant. Foss. p. 120.
„ Genera et Species, p. 233.
„ Neues Jahrbuch, 1842, p. 608.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 161, pl. xvi. fig. 1, pl. xvii. figs. 7–9.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 87.
Zeiller, Végét. Foss. du Terr. Houil. p. 135, pl. clxxiv. fig. 1.

Sigillaria Menardi.
Brongniart (*in part*), Hist. d. Végét. Foss. pl. clviii. fig. 6 (not fig. 5).

Sigillaria Serlii.
Carruthers, Geol. Mag. 1883, Dec. ii. vol. x. p. 49, pl. ii.

Clathraria Brardii.
Brongniart, Classif. d. Végét. Foss. pl. i. fig. 5.

Favularia Brardii.
Sternberg, Vers. i. fasc. iv. p. 14.

Catenaria decora.
Germar, Vers. v. Wettin u. Löbejun, p. 30, pl. xi. fig. 3.
Rost, De Fil. Ectypis, p. 15.
Sternberg, Vers. i. fasc. 4, p. 25, pl. lii. fig. 1.

Sigillaria dubia.
Brongniart, Prodrome, p. 65.

Lepidophloios platystigma.
Dawson, Acadian Geol. 2nd ed. p. 490, fig. 170*e*, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 164, pl. x. figs. 47, 48, 1866.
„ Canadian, Nat. vol. viii. p. 453.

Lepidodendron sexangulare.
Eichwald, Lethæa Rossica, p. 114, pl. v. figs. 8, 9 (excl. syn.).

Lepidodendron ottonis.
Göppert, Syst. Fil. Foss. p. 462, pl. xlii. figs. 2, 3.

Lepidodendron dichotomum.
Rost, De Fil. Ectypis, p. 9.

Horizon.—Coal Measures.
Locality.—Foreign. France : Mines of La Croizet, St. Etienne (Presented by M. C. Chantre).

SECTION LEIODERMARIÆ.

Sigillaria aquensis, König, sp.

Lepidodendron aquense.
König, Icones Fossilium Sectiles, pl. xiv. fig. 164.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia. (The Type figured by König.)

Sigillaria monostigma, Lesquereux.

Sigillaria monostigma.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 449, pl. xlii. figs. 1–5, vol. iv. p. 446, pl. xxvi. fig. 5.
„ Coal Flora of Pennsyl. p. 468, pl. lxxiii. figs. 3–6.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 101.

Horizon.—Coal Measures.
Locality.—Foreign. United States: Pennsylvania.

SECTION RHYTIDOLEPIS.

Sigillaria tessellata, Brongniart.

Sigillaria tessellata.
Boulay, Terr. Houil. du Nord de la France, p. 40.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 436, pl. clvi. fig. 1, pl. clxii. figs. 1, 2, 3, 4.
Bronn, Index Palæont. p. 1145.
Dawson, Foss. Plants Lower Carb. Canada, p. 35.
„ Canadian Nat. vol. viii. p. 434.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 146.
„ Acadian Geol. 2nd ed. p. 474, 1868.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 229, pl. l. figs. 1, 2.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 44, pl. v. figs. 6–9.
Giebel, Deutschl. Petrefacten, p. 75.
Goldenberg, Flora Saræp. Foss. heft ii. p. 29, pl. vi. figs. 14, 15.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 157.
Heer, Flora Foss. Helv. lief. i. p. 41, pl. xvi. figs. 3, 4.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 451.
„ Geol. of Pennsyl. vol. ii. p. 872.
„ Coal Flora of Pennsyl. p. 481, pl. lxxii. figs. 2–4.
Ludwig, Bull. Soc. Imp. Nat. Moscou. p. 23, 1876.
Nauman, Neues Jahrbuch, 1842, p. 414.
Renault, Cours d. Botan. Foss. 1881, p. 132, pl. xvii. fig. 3.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 98, pl. ix. figs. 2–8.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 81, pl. lxviii. fig. 1.
Unger, Synop. Plant. Foss. p. 120.
„ Genera et Species, p. 235.
Weiss, Verh. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 87.
Zeiller, Végét. Foss. du Terr. Houil. p. 132, pl. clxxiii. fig. 2.
„ Flore Houil. des Asturies, p. 15.

Favularia tessellata.
Lindley and Hutton, Foss. Flora, vol. i. pls. lxxiii. lxxiv. lxxv.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.

Phytolithus tessellatus.
Steinhauer, Trans. Amer. Phil. Soc. vol. i. p. 295, pl. vii. fig. 2.

Sigillaria elegans.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 124.
Boulay, Terr. Houil. du Nord de la France, p. 40.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 438, pl. cxlvi. fig. 1, pl. clv. and clviii. fig. 1.
Bronn, Index Palæont. p. 1144.
„ Lethæa Geog. vol. i. part ii. p. 134, pl. vi. fig. 6.
Dawson, Foss. Plants Lower Carb. Canada, p. 35.
„ Acadian Geol. 2nd ed. p. 474, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 146, pl. vii. fig. 26.
„ Canadian Nat. vol. viii. p. 434.
Ettingshausen, Steinkf. v. Radnitz, p. 62.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 230, pl. l. fig. 3.
Giebel, Deutschl. Petrefacten, p. 75.
Goldenberg, Flora Saræp. Foss. heft ii. p. 27, pl. vi. figs. 16, 17.
Grand 'Eury (*in part*), Flore Carbon. du Dép. de la Loire, p. 158.
Kimball, Flora from the Appalachian Coalfield, p. 20, 1857.
König, Icones Fossilium Sectiles, pl. xv. fig. 184.
Renault, Cours d. Botan. Foss. 1881, p. 132, pl. xvii. fig. 4, and 4 *bis*.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 96, pl. viii. fig. 9, and pl. xxviii. fig. 6.
Unger, Synop. Plant. Foss. p. 121.
„ Genera et Species, p. 235.
Zeiller, Végét. Foss. du Terr. Houil. p. 134.

Sigillaria Knorrii.
Boulay, Terr. Houil. du Nord de la France, p. 41.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 444, pl. clvi. figs. 2, 3, pl. clxii. fig. 6.
Bronn, Index Palæont. p. 1144.
Dawson, Acadian Geol. 2nd ed. p. 475, 1868.
„ Foss. Plants Lower Carb. Canada, p. 35.
„ Canadian Nat. vol. viii. p. 436.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 148.
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 97.
„ Vers. d. Böhm. Kohlenab. p. 231, pl. l. figs. 7, 8.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. heft ii. p. 28, pl. vii. fig. 18.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 872.
Roehl, Foss. Flora d. Steink.-Form. Westph. p. 98, pl. xxviii. fig. 12.
Unger, Synop. Plant. Foss. p. 122.
„ Genera et Species, p. 236.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 87.

Sigillaria hexagona.
Bronguiart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. pls. clv. and clviii. fig. 1.
Goldenberg, Flora Saræp. Foss. pl. vi. fig. 16.
Lesquereux, Coal Flora of Pennsyl. p. 483 (pl. lxxii. fig. 1 ?)
Unger, Neues Jahrbuch, 1842, p. 608.
Zeiller, Flore Houil. des Asturies, p. 15.

? Sigillaria ichthyolepis.
Corda, Flora d. Vorwelt, p. 29, pl. ix. fig. 19.
Bronn, Index Palæont. p. 1144.
Ettingshausen, Steinkf. v. Radnitz, p. 61.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 231, pl. l. fig. 4.
Giebel, Deutschl. Petrefacten, p. 75.
Goldenberg, Flora Saræp. Foss. heft ii. p. 27, pl. vii. fig. 17.

Kimball, Flora from the Appalachian Coalfield, p. 21, pl. ii. fig. 2, 1857.
Lesquereux, Coal Flora of Pennsyl. p. 482, pl. lxxiii. fig. 7.
Unger, Genera et Species, p. 231.

Sigillaria alveolaris.
Boulay, Terr. Houil. du Nord de la France, p. 41.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 443, pl. clxii. fig. 5.
Bronn, Index Palæont. p. 1143.
Ettingshausen, Steinkf. v. Radnitz, p. 62.
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 96.
„ Vers. d. Böhm. Kohlenab. p. 232, pl. li. fig. 2.
„ Steinkf. v. Kralup. in Böhm. p. 14.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. p. 40, heft ii. pl. vii. fig. 16.
König, Icones Fossilium Sectiles, pl. xiv. fig. 166.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 872.
Unger, Synop. Plant. Foss. p. 121.
„ Genera et Species, p. 236.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 167.

Lepidodendron alveolare.
Sternberg, Vers. i. fasc. i. p. 23, pl. ix. fig. 1*a–b*.

Lepidodendron alveolatum.
Sternberg, Vers. i. fasc. i. p. 21, pl. ix. fig. 1.

Sigillaria minima.
Boulay, Terr. Houil. du Nord de la France, p. 40.
Brongniart, Hist. d. Végét. Foss. p. 435, pl. clviii. fig. 2.
Bronn, Index Palæont. p. 1145.
Goldenberg, Flora Saræp. Foss. heft ii. p. 26, pl. vi. fig. 15.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 96, pl. i. fig. 8*b* (? pl. ix fig. 7).
Unger, Synop. Plant. Foss. p. 120.
„ Genera et Species, p. 234.

Sigillaria ornata.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 434, pl. clviii. fig. 8 (? fig. 7).
Bronn, Index Palæont. p. 1145.
Corda, Flora d. Vorwelt, p. 29, pl. ix. fig. 21.
Ettingshausen, Steinkf. v. Raduitz, p. 61.
Giebel, Deutschl. Petrefacten, p. 75.
Goldenberg, Flora Saræp. Foss. heft ii. p. 26, pl. vii. figs. 3, 4.
Nauman, Neues Jahrbuch, 1842, p. 414.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 142.
Unger, Synop. Plant. Foss. p. 120.
„ Genera et Species, p. 233.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 87.

Sigillaria microstigma.
Brongniart, Hist. d. Végét. Foss, p. 478, pl. cxlix. fig. 2.
Bronn, Index Palæont. p. 1145.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 233, pl. l. fig. 1*b*.
Giebel, Deutschl. Petrefacten, p. 78.
Goldenberg, Flora Saræp. Foss. heft ii. p. 52, pl. viii. fig. 30.
Unger, Synop Plant. Foss. p. 126.
„ Genera et Species, p. 249.

Sigillaria Zwickaviensis.
Bronn, Index Palæont. p. 1146.

Calamosyrinx Zwickaviensis.
Petzholdt, Neues Jahrbuch, 1842, p. 181, pl. v.
Unger, Synop. Plant. Foss. p. 259.
„ Genera et Species, p. 521.

Sigillaria approximata.
Fontaine and White, Perm. or Upper Carb. Flora, p. 96, pl. xxxvii. fig. 3.

Sigillaria sexangula.
Sauveur, Végét. Foss. de la Belgique, pl. liii. fig. 1.

? Favularia nodosa.
Lindley and Hutton, Foss. Flora, vol. iii. pl. cxcii.
Nauman, Neues Jahrbuch, 1842, p. 414.

Favularia variolata.
Sternberg, Vers. i. fasc. 4, p. xiii.

Favularia obovata.
Sternberg, Vers. i. fasc. 4, p. xiii.

Favularia ichthyolepis.
Sternberg, Vers. ii. pl. xxxviii. fig. 2*b*.

Favularia elegans.
Sternberg, Vers. i. p. 14, pl. lii. fig. 4.

Favularia hexagona.
Sternberg, Vers. i. fasc. 4, p. xiii.

Lepidodendron hexagonum.
Rost, De Fil. Ectypis, p. 10.
Sternberg, Vers. i. fasc. 1, p. 23.

Palmacites hexagonatus.
Schlotheim, Petrefactenkunde, p. 394, pl. xv. fig. 1.

Palmacites variolatus.
Schlotheim, Petrefactenkunde, p. 395, pl. xv figs. 3*a–b*.

Aspidiaria variolata.
Sternberg, Vers. ii. p. 181, pl. lxviii. fig. 12.
Parkinson, Organic Remains, vol. i. pl. v. fig. 8.

As the Root of Sigillaria Tesselata.

? Stigmaria conferta.

Bronn, Index Palæont. p. 1200.
Corda, Flora d. Vorwelt, p. 34, pl. xiii. figs. 9, 10.
Ettingshausen, Steinkf. v. Radnitz, p. 61.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 262, pl. l. figs. 5, 6.
Giebel, Deutschl. Petrefacten, p. 78.
Goldenberg, Flora Saræp. Foss. heft iii. p. 15, pl. xii. figs. 1, 2.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 116.
Unger, Genera et Species, p. 227.

Remarks.—*Sigillaria minuta*, Römer (Palaeontographica, vol. ix. p. 41, pl. x. fig. 2). is perhaps only a variety of *Sigillaria tessellata.*

Sigillaria approximata, Fontaine and White (Permian or Upper Carboniferous Flora, p. 96, pl. xxxvii. fig. 3), does not appear to differ in any way from *Sigillaria ichthyolepis*, Corda, which has been already united with *Sigillaria tessellata* by Schimper. It is true that Corda's plant differs much from many forms of *Sigillaria tessellata*, especially if it is compared with the variety originally named *Sigillaria alveolaris*, but these two extremes are apparently

connected by a long chain of varieties, which gradually pass into one another. Some Botanists, however, still regard several of the names here placed under *Sigillaria tessellata* as distinct species.

The Collection contains several specimens showing the verticils of fruit-scars. The alteration in the form and arrangement of the leaf-scars in the region of the verticils is in some cases very marked. On a specimen from Yorkshire the leaf-scars near the verticil of fruit-scars are much smaller and more closely placed than on the other parts of the stem, where they are separated from each other by half their own length. Those leaf-scars in the immediate neighbourhood of the verticil are also much more elongated in form, being only about half the breadth of the scars more distant from the verticil. The form and arrangement of the leaf-scars in this species are subject to more variation than in any other member of the genus.

I am inclined to think that the *Favularia nodosa* (Bowman, MS.), L. and H., is not specifically distinct from *Sigillaria tessellata*.

The specimen identified as *Sigillaria elegans* by Brongniart, and of which he described the structure (Observ. Sur. la Struct. Intér. d. *Sigillaria elegans;* Archiv. du Mus. d'Hist. Nat. p. 405, pl. xxv.–xxviii. 1839), does not apparently belong to this species. Renault (Cours d. Botan. Foss. 1883, p. 14) places it under *Sigillaria Menardi*, Brongt., but I prefer referring it to *Sigillaria Brardii*. It is to be noted, however, that one of Brongniart's figures of *Sigillaria Menardi* (Hist. d. Végét. Foss. pl. clviii. fig. 6, not 5) is now recognised as a young specimen of *Sigillaria Brardii*, Brongt.

In the Collection are several specimens of *Stigmaria conferta*, Corda, which I am disposed to regard as the root of *Sigillaria tessellata*. From the examination of these and other examples of this fossil, there appears to be a gradual transition in the form of the scars from *Sigillaria ornata* to *Stigmaria conferta*. As far as I know, the latter has in Britain always been found associated with *Sigillaria tessellata*. This, of course, is no proof that it is the root of that plant, but when taken in conjunction with the characters that the specimens themselves show, it strengthens the probability of this view.

Horizon.—Coal Measures.

Localities.—British. Derbyshire: Riddings. Lancashire: near Manchester. Northumberland: Newcastle-on-Tyne. Somersetshire: Radstock.

Foreign. Bavaria: Langenbrücken. Belgium: Mons. Rhenish Prussia; Saarbrück. Westphalia: Werne, near Bochum; Wattenscheidt; Steele; Langendreer.

Stigmaria conferta, Corda.

British. Northumberland: Newcastle-on-Tyne. Somersetshire: Camerton.

Sigillaria Dournaisii, Brongniart.

Sigillaria Dournaisii.

Andrae, Jahrb d. Naturw. Vereines, Halle, 1850, p. 124.
Boulay, Terr. Houil. du Nord de la France, p. 40.
Bronguiart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 441, pl. cliii. fig. 5.
Bronn, Index Palæont. p. 1144.
Dawson, Acadian Geol. 2nd ed. 1868, p. 475.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 148.
„ Canadian Nat. vol. viii. p. 436.
„ Foss. Plants Lower Carb. Canada, p. 35.
Goldenberg, Flora Saræp. Foss. heft ii. p. 28, pl. vii. figs. 22–24.
Heer, Flora Foss. Helv. lief. i. p. 41, pl. xvi. fig. 2.
„ Urwelt d. Schweiz, p. 5, fig. 1.
Lesquereux, Coal Flora of Pennsyl. p. 480.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 98 pl. vii. fig. 4.

Schimper, Traité d. Paléont. Végét. vol. ii. p. 82.
Unger, Synop. Plant. Foss. p. 121.
„ Genera et Species, p. 236.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 87.

Sigillaria trigona.
Brongniart, Prodrome, p. 65.
Giebel, Deutschl. Petrefacten, p. 78.

Favularia trigona.
Sternberg, Vers. i. fasc. 4, p. xiii, pl. xi. fig. 1.

Lepidodendron trigonum.
Sternberg, Vers. i. fasc. 1, p. 23, pl. xi. fig. 1.

Horizon.—Coal Measures.
Locality.—British. South Wales (?).

Sigillaria pachyderma, Brongniart.

Sigillaria pachyderma.
Boulay, Terr. Houil. du Nord de la France, p. 43.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 452, pl. cl. fig. 1.
Bronn, Index Palæont. p. 1145.
Dawson, Acadian Geol. 2nd ed. p. 475.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. heft ii. p. 31, pl. viii. fig. 9.
? Lindley and Hutton, Foss. Flora, vol. i. pls. liv. lv.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 100.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 86, pl. lxviii. fig. 7.
Unger, Synop. Plant. Foss. p. 123.
„ Genera et Species, p. 239.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.

Sigillaria scutellata.
Boulay, Terr. Houil. du Nord de la France, p. 43.
Brongniart, Class d. Végét. Foss. p. 22, pl. i. fig. 4.
„ Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 455, pl. cl. figs. 2, 3, pl. clxiii. fig. 3.
Bronn, Index Palæont. p. 1145.
Dawson, Acadian Geol. 2nd ed. p. 474, 1868.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 146.
„ Canadian Nat. vol. viii. p. 434.
„ Foss. Plants. Lower Carb. Canada, p. 38.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
Goldenberg, Flora Saræp. Foss. heft ii. p. 30, pl. viii. fig. 10.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 872.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 99, pl. xxviii. figs. 14–16.
Schimper, Traité d. Paléont. Végét. vol. ii. p 86.
Unger, Synop. Plant. Foss. p. 123.
„ Genera et Species, p. 240.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.
Zeiller, Végét. Foss. du Terr. Houil. p. 129.

Rhytidolepis scutellata.
Sternberg, Vers. i. fasc. 4, p. xxiii.

Sigillaria elliptica.
Zeiller, Végét. Foss. du Terr. Houil. p. 130, pl. clxxiii. fig. 1.*

Euphorbites vulgaris.
Artis, Anted. Phytol. pl. xv.

? Sigillaria Candollii.
Boulay, Terr. Houil. du Nord de la France, p. 42.
Brongniart, Hist. d. Végét. Foss. p. 463, pl. cl. fig. 4.
„ Prodrome, p. 64.
Bronn, Index Palæont. p. 1144.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 238.
„ Steinkf. v. Kralup in Böhm. pp. 14 and 35.
„ Steinkohl. u. Perm.-Ablager, p. 96.
Goldenberg, Flora Saræp. Foss. heft ii. p. 44, pl. viii. fig. 11.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 107.
Schimper, Traité. d. Paléont. Végét. vol. ii. p. 86.
Unger, Synop. Plant. Foss. p. 124.
„ Genera et Species, p. 243.

Remarks.—I have united with *Sigillaria pachyderma*, Brongniart, *Sigillaria scutellata* of the same author. This species is not uncommon in some localities in Britain, and from the examination of numerous specimens I have been unable to discover any fixed character by which the two species can be separated.

I am further inclined to regard *Sigillaria Candollii*, Brongniart, as also referable to *Sigillaria pachyderma*. The figure of this species given by Brongniart does not appear to have been taken from a well-preserved specimen, and the leaf-scars are scarcely different from those of his *Sigillaria pachyderma* or *Sigillaria scutellata*. The specific characters of *Sigillaria Candollii* seem to be more dependent on the state of preservation of the fossil than on any real structural peculiarity.

The large trunk figured by Lindley and Hutton as *Sigillaria pachyderma* (Fossil Flora, vol. i. pls. liv. lv.) is not sufficiently well preserved for specific determination.

Horizon.—Coal Measures.

Localities.—British. Lancashire : Ashton-under-Lyne, near Lancaster. Northumberland : Newcastle-on-Tyne. Worcestershire : Forest of Wyre.

Foreign. Bohemia : Radnitz.

Sigillaria mammillaris, Brongniart.

Sigillaria mammillaris.
Boulay, Terr. Houil. du Nord de la France, p. 44.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 451, pl. cxlix. fig. 1, and pl. clxiii. fig. 1 (*var.*)
„ Ann. d. Sc. Nat. vol. iv. p. 33, pl. ii. fig. 5.
Bronn, Index Palæont. p. 1144.
Feistmantel, Steinkohl. u. Perm.-Ablager, p. 95.
„ Vers. d. Böhm. Kohlenab. p. 237, pl. li. fig. 1.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. heft ii. p. 32, pl. viii. figs. 6–8.
Lesquereux, Coal Flora of Pennsyl. p. 483, pl. lxxii. figs. 5, 6.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 101 (pl. ix. fig. 4 (?)).
Schimper, Traité d. Paléont. Végét. vol. ii. p. 83.
Unger, Synop. Plant. Foss. p. 122.
„ Genera et Species, p. 239.

* See Ann. d. Sc. Nat. 6e ser. vol. xix. p. 263.

Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 164, pl. xv. 1–4.
„ Verhandl. d. Natur. Vereines d. Preuss Rheinl. u. Westph. 1868, p. 88.
Zeiller, Végét. Foss. du Terr. Houil. p. 131.

Sigillaria pyriformis.
Boulay, Terr. Houil. du Nord de la France, p. 45.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 448, pl. cliii. figs. 3, 4.
Bronn, Index Palæont. p. 1145.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 237, pl. li. fig. 6.
„ Steinkohl. u. Perm.-Ablager. p. 98.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg Flora Saræp. Foss. heft ii. p. 30, pl. viii. fig. 4.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 85, pl. lxviii. fig. 5.
Unger, Synop. Plant. Foss. p. 122.
„ Genera et Species, p. 238.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 164.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.

Sigillaria trigona.
König, Icones Fossilium Sectiles, pl. xv. fig. 183.

Sigillaria affinis.
König, Icones Fossilium Sectiles, pl. xiv. fig. 165.

Remarks.—If the gradual elevation of the leaf-scars from above downwards is regarded as an essential character of *Sigillaria mammillaris*, then *Sigillaria pyriformis*, Brongniart, cannot be united with it. It should not however be ignored that, in many specimens which have been subjected to pressure, the elevated nature of the leaf-scar is entirely obliterated, and it is this state of *Sigillaria mammillaris* which I believe constitutes the *Sigillaria pyriformis* of Brongniart.

Weiss, in his "Fossil Flora der jüngsten Steinkohlenformation und des Rothliegenden," has entered very clearly into this subject, and probably, as he indicates, some other species will eventually require to be united with *Sigillaria mammillaris*.

Horizon.—Coal Measures.

Localities.—*British.* Durham: Sunderland. Lancashire: Ashton-under-Lyne, near Lancaster. Worcestershire: Dudley; Forest of Wyre. Wales (South): Ebbw Vale, Merthyr-Tydvil.
Foreign. Belgium: Liége. Silesia: Waldenburg. Westphalia: Herten.

Sigillaria Boblayi, Brongniart.

Sigillaria Boblayi.
Boulay, Terr. Houil. du Nord de la France, p. 40.
Brongniart, Prodrome, p. 65.
„ Hist. d. Végét. Foss. p. 446, pl. cliv.
Bronn, Index Palæont. p. 1143.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 104, pl. ix. fig. 6.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 84.
Unger, Synop. Plant. Foss. p. 122.
„ Genera et Species, p. 237.

Remarks.—Roehl unites with this species *Sigillaria Grisebachi*, Römer (Palaeontographica, vol. x. p. 43, pl. x. fig. 3), but judging from Römer's figure and description it seems very different from Brongniart's plant.

Horizon.—Coal Measures.

Locality.—British. (?)

Sigillaria Saullii, Brongniart.

Sigillaria Saullii.
Boulay, Terr. Houil. du Nord de la France, p. 42.
Brongniart, Hist. d. Végét. Foss. p. 456, pl. cli.
Bronn, Index Palæont. p. 1145.
Dawson, Acadian Geol. 2nd ed. 1868, p. 474.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 146.
„ Canadian Nat. vol. viii. p. 434.
„ Foss. Plants of Lower Carb. Canada, p. 35.
Goldenberg, Flora Saræp. Foss. heft ii. p. 31, pl. viii. fig. 22.
Renault, Cours. d. Botan. Foss. 1881, p. 133, pl. xvii. fig. 5.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 101.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 85.
Unger, Synop. Plant. Foss. p. 123.
„ Genera et Species, p. 241.
Horizon.—Coal Measures.
Locality.—British. Northumberland : Newcastle-on-Tyne.

Sigillaria Utschneideri, Brongniart.

Sigillaria Utschneideri.
Brongniart, Hist. d. Végét. Foss. p. 453, pl. clxiii. fig. 2.
Bronn, Index Palæont. p. 1146.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. heft ii. p. 33, pl. viii. fig. 13.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 102.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 83.
Unger, Synop. Plant. Foss. p. 123.
„ Genera et Species, p. 240.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.

Sigillaria Graeseri.
Boulay, Terr. Houil. du Nord de la France, p. 41.
Brongniart, Hist. d. Végét. Foss. p. 454, pl. clxiv. fig. 1.
Bronn, Index Palæont. p. 1144.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. heft ii. p. 33, pl. viii. fig. 14.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 83.
Unger, Synop. Plant. Foss. p. 123.
„ Genera et Species, p. 240.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.

Sigillaria gracilis.
Brongniart, Hist. d. Végét. Foss. p. 462, pl. clxiv. fig. 2.
Bronn, Index Palæont. p. 1144.
Giebel, Deutschl. Petrefacten, p. 77.
Goldenberg, Flora Saræp. Foss. heft ii. p. 40, pl. viii. fig. 15.
Unger, Synop. Plant. Foss. p. 124.
„ Genera et Species, p. 243.

Sigillaria coarctata.
Goldenberg, Flora Saræp. Foss. heft ii. p. 36, pl. ix. fig. 3.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 89.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 88.

Remarks.—I have united with this species *Sigillaria coarctata*, Goldenberg, the chief distinguishing character of which lies in the ribs being only wrinkled below the leaf-scars, whereas in *Sigillaria Utschneideri* the wrinkles cover the whole of the interfoliar spaces on the ribs.

In the specimen from Forest of Wyre, on those parts where it is better preserved, the wrinkles on the ribs cover the whole space between the leaf-scars, though more strongly marked immediately below them; in other parts of the fossil, only the stronger wrinkles below the leaf-scars are shown, in which condition it agrees with *Sigillaria coarctata*, Goldenberg.

Sigillaria Graeseri, Brongniart, and *Sigillaria gracilis*, Brongniart, seem to be only slightly younger and smaller examples of *Sigillaria Utschneideri*, and not specifically distinct from that species.

Horizon.—Coal Measures.
Locality.—British. Worcestershire: Forest of Wyre.

Sigillaria Polleriana, Brongniart.

Sigillaria Polleriana.
Boulay, Terr. Houil. du Nord de la France, p. 46.
Brongniart, Hist. d. Végét. Foss. p. 472, pl. clxv. fig. 2.
Goldenberg, Flora Saræp. Foss. heft ii. p. 49, pl. viii. fig. 17.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 97.
Unger, Synop. Plant. Foss. p. 125.
„ Genera et Species, p. 246.

Horizon.—Coal Measures.
Locality.—Foreign. Westphalia: Lütgendortmund.

Sigillaria rugosa, Brongniart.

Sigillaria rugosa.
Boulay, Terr. Houil. du Nord de la France, p. 45.
Brongniart, Prodrome, p. 64.
„ Hist. d. Végét. Foss. p. 476, pl. cxliv. fig. 2.
Bronn, Index Palæont. p. 1145.
Giebel, Deutschl. Petrefacten, p. 76.
Goldenberg, Flora Saræp. Foss. heft ii. p. 48, pl. viii. fig. 26.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 157.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 873.
„ Coal Flora of Pennsyl. p. 497.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 110, pl. xxx. fig. 4.
Schimper, Traité d Paléont. Végét. vol. ii. p. 92.
Unger, Synop. Plant. Foss. p. 126.
„ Genera et Species, p. 249.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 89.
Zeiller, Végét. Foss. du Terr. Houil. p. 126, pl. clxxiii. fig. 3.

Sigillaria rimosa.
Sauveur, Végét. Foss. de la Belgique, pl. lviii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 90.

Remarks.—Boulay has already pointed out that *Sigillaria rimosa*, Sauveur, does not differ from *Sigillaria rugosa*, Brongniart.*
Sauveur's plant must not however be mistaken for Goldenberg's *Sigillaria rimosa*, which is essentially distinct.†

Horizon.—Coal Measures.
Locality.—British. Yorkshire: Wakefield.

Sigillaria Davreuxii, Brongniart.

Sigillaria Davreuxii.
Boulay, Terr. Houil. du Nord de la France, p. 41.
Brongniart, Prodrome, p. 64.

* Terr. Houil. du Nord de la France, p. 46.
† Goldenberg, Flora Saræp. Foss. heft ii. p. 22, pl. vi. figs. 1–4.

Brongniart, Hist. d. Végét. Foss. p. 465, pl. cxlviii.
Bronn, Index Palæont. p 1144.
Goldenberg, Flora Saræp. Foss. heft ii. p. 41, pl. viii. fig. 5.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 83, pl. lxviii. fig. 4.
Unger, Synop. Plant. Foss. p. 124.
„ Genera et Species, p. 244.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia.

Sigillaria Feistmanteli, Geinitz.

Sigillaria Feistmanteli.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 236, pl. li. figs. 4, 5.
Geinitz, Neues Jahrbuch, 1865, p. 392, pl. iii. fig. 4.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia.

Sigillaria aspera, Goldenberg.

Sigillaria aspera.
Goldenberg, Flora Saræp. Foss. heft ii. p. 35, pl. ix. fig. 2.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 88.

Remarks.—This species is very closely related to *Sigillaria subrotunda*, Brongniart (Hist. d. Végét. Foss. p. 458, pl. cxlvii. figs. 5, 6).
Horizon.—Coal Measures.
Locality.—British. (?)

Sigillaria ocellata, Sternberg, sp.

Sigillaria ocellata.
Roehl (*in part*), Foss. Flora d. Steink. Form. Westph. p. 100, pl. ix. fig. 1, pl. xxviii. fig 7.

Rhytidolepis ocellata.
Sternberg, Vers. i. fasc. 2, pp. 24 and 32, pl. xv. (excl. syn.).

Rhytidolepis undulata.
Sternberg, Vers. i. fasc. 4, p. xxiii. pl. xv.

Remarks.—Considerable confusion has arisen in regard to this plant. Sternberg gives a figure of a *Sigillaria* on pl. xv., which he names *Rhytidolepis ocellata*. To this he mentions as a synonym *Palmacites* (*Sigillaria*) *variolatus*, Schlotheim (Petrefactenkunde, p. 395, pl. xv. fig. 3). There can, I think, remain no doubt as to Schlotheim's plant being a decorticated specimen of *Sigillaria tessellata*. This has already been pointed out by Brongniart (Hist. d. Végét. Foss. p. 439). Hence the reference to Schlotheim must be excluded from *Sigillaria ocellata*, Sternberg.

Sternberg further gives as a synonym to his *Sigillaria* (*Rhytidolepis*) *ocellata*, *Palmacites* (*Sigillaria*) *oculatus*, Schlotheim (Petrefactenkunde, p. 394, pl. xvii.). This is also quite distinct from the plant figured by Sternberg on his plate xv., the leaf-scars having a distinct notch on their upper margins, the lateral angles being much less pronounced. *Palmacites oculatus*, Schlotheim, has been excluded from *Sigillaria ocellata* by Brongniart (Prodrome, p. 64). Brongniart, though keeping separate *Sigillaria oculata*, Schlotheim, from Sternberg's *Sigillaria ocellata*, unites Sternberg's plant, in doubt, with his *Sigillaria pachyderma*. This seems to be an error.

The main figure in Sternberg's plate is decorticated, but shows the furrows to be alternately constricted and enlarged, a character scarcely observable in *Sigillaria pachyderma*. Of the other figures given by Sternberg of his *Sigillaria ocellata*, that on the right hand of his plate is difficult to explain, but that at the lower left hand corner, which is an impression of a portion of

the main figure, shows the leaf-scars, and it is with this figure that the specimen in the Collection agrees.

The leaf-scars on the Yorkshire example are more oval, but from their general similarity to those on the specimen figured by Sternberg from Swina, I have no doubt that both plants are the same species.

Roehl (Foss. Flora d. Steink. Form. Westph. pp. 100 and 106) gives as separate species *Sigillaria ocellata* and *Sigillaria oculata*, but gives as a synonym to each "*Palmacites oculatus*, Schlotheim."

Of *Sigillaria ocellata* Roehl gives three figures (*loc. cit.* pl. ix. fig. 1, pl. xxvi. fig. 10, and pl. xxviii. fig. 7). The specimen figured on his pl. xxvi. fig. 10 does not appear to be in a satisfactory state of preservation for specific determination, and may not belong to this plant. That on his plate xxviii. fig. 7 is the one with which the specimen in the Collection agrees, though the British example is in a better state of preservation. His figure, however, shows the characters of the species well, and is, I believe, the true *Sigillaria ocellata*, Sternberg. The two synonyms then, *Palmacites oculatus*, Schlotheim, and *Palmacites variolatus* of the same author, must be excluded from *Sigillaria ocellata*, Sternberg.

Unger unites *Sigillaria ocellata*, Sternberg, with *Sigillaria oculata*, Brongniart, in doubt, and is followed in this by Goldenberg. Schimper, on the other hand, unites *Sigillaria ocellata* (*Rhytidolepis undulata*) with *Sigillaria subrotunda*, Brongniart,* and this view is adopted by Feistmantel.†

Horizon.—Coal Measures.
Locality.—*British.* Yorkshire.

Sigillaria grandis, Sauveur.

Sigillaria grandis.
Sauveur, Végét. Foss. de la Belgique, pl. lvii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 95.

Horizon.—Coal Measures.
Locality.—*British.* (?)

Sigillaria coriacea, Kidston.

Sigillaria coriacea.
Kidston, Annals and Mag. Nat. Hist. 5th ser. vol. xv. p. 360, pl. xi. fig. 2.

Description.—Ribs alternately widening and contracting, leaf-scars placed on the dilations, slightly broader than high, and somewhat less apart than twice their vertical height, lateral angles prominent, with downward running ridges; vascular impression situated towards the upper part of the leaf-scar, central impression punctiform, the two lateral lunate. Outer surface of the ribs ornamented with a fine granulation.

Remarks.—The Collection contains several specimens of this species. The ribs at their widest part measure $\frac{6}{10}$ inch; the leaf-scars are fully $\frac{6}{10}$ inch in transverse diameter, and $\frac{5}{10}$ inch long. The granulation which covers the outer surface of the ribs is very similar to the texture of leather.

All the examples in the British Museum are beautifully preserved, and have wide ribs with large leaf-scars.

Horizon.—Coal Measures.
Locality.—*British.* (?) Northumberland: Newcastle-on-Tyne.

Sigillaria lævigata, Brongniart.

Sigillaria lævigata.
Boulay, Terr. Houil. du Nord de la France, p. 42.

* Schimper, Traité d. Paléont. Végét. vol. ii. p. 89.
† Feistmantel, Vers. d. Böhm. Kohlenab. p. 242.

Brongniart, Prodrome, p. 66.
„ Hist. d. Végét. Foss. p. 471, pl. cxliii.
Bronn, Index Palæont. p. 1144.
Dawson, Acadian Geol. 2nd ed. 1868, p. 474.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 147.
„ Canadian Nat. vol. viii. p. 434.
„ Foss. Plants Lower Carb. Canada, p. 35.
Fairchild, Ann. New York Acad. Sciences, vol. i. p. 45, pl. iv.
Giebel, Deutschl. Petrefacten, p. 77.
Goldenberg, Flora Saræp. Foss. heft ii. p. 51, pl. viii. fig. 32
Lesquereux, Coal Flora of Pennsyl. p. 500, pl. lxxi. figs. 1–3.
„ Geol. of Pennsyl. vol. ii. p. 873.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 93.
Unger, Synop. Plant. Foss. p. 125.
„ Genera et Species, p. 246.
„ Neues Jahrbuch, 1842, p. 608.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 89.
Zeiller, Végét. Foss. du Terr. Houil. p. 125.

Sigillaria lævis.
Sauveur, Végét. Foss. de la Belgique, pl. l. fig. 2.

? Sigillaria ovata.
Sauveur, Végét. Foss. de la Belgique, pl. li. fig. 2.

? Sigillaria rugosa.
Kimball, Flora from the Apalachian Coalfield, 1857, p. 17, pl. ii. fig. 1.

Remarks.—The type specimen, as figured by Brongniart, shows the ribs on the stem fully 1½ inch wide, while the leaf-scars are only about ¼ inch in transverse diameter.

This plant is very plentiful in the Radstock Coalfield, where I have examined many examples. In the younger condition, when the ribs are about ½ inch in width, the scars are about ¼ inch in diameter: from this stage one can trace the growth of the ribs in width, but little perceptible enlargement in the size of the leaf-scar takes place.

Horizon.—Coal Measures.
Localities.—British. Northumberland: Newcastle-on-Tyne. Somersetshire: Radstock.
Decorticated specimens *probably* referable to this species:
Localities.—British. Lancashire: Pendleton. Wales (South): Ebbw Vale, near Merthyr-Tydvil.
Foreign. France: Mines of La Croizet, St. Etienne.

Sigillaria reniformis, Brongniart.

Sigillaria reniformis.
Andrae, Jahrb. d. Natur. Vereines, Halle, 1850, p. 124.
Boulay, Terr. Houil. du Nord de la France, p. 42.
Brongniart, Prodrome, p. 64.
„ Hist. d. Végét. Foss. p. 470, pl. cxlii. and clx.
„ Ann. d. Sc. Nat. vol. iv. p. 32, pl. ii. fig. 2.
Bronn, Index Palæont. p. 1145.
„ Lethæa Geog. vol. i. part ii. p. 134, pl. v. fig. 5.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86, vol. iii. p. 432, 1847.
Dawson, Acadian Geol. 2nd ed. 1868, p. 474.
„ Geol. Survey of Canada, Reports, 1874–5, p. 196.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 146.
„ Canadian Nat. vol. viii. p. 434.
„ Foss. Plants Lower Carb. Canada, p. 35.
Fairchild, Ann. New York Acad. Sciences, vol. i. p. 42, pl. iii.

Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Giebel, Deutschl. Petrefacten, p. 77.
Goldenberg, Flora Saræp. Foss. heft ii. p. 50, pl. viii. fig. 31.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 873.
„ Report, Geol. Survey of Illinois, vol. ii. p. 451.
„ Coal Flora of Pennsyl. p. 501, pl. lxx. figs. 5–9.
Lindley and Hutton, Foss. Flora, vol. i. pl. lvii. and pl. lxxi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 112, pl. xxx. fig. 6.
Sauveur, Végét Foss. de la Belgique, pl. l. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 94, pl. lxvii. figs. 1, 8, 9, and pl. lxviii. fig. 9.
Unger, Synop. Plant. Foss. p. 125.
„ Genera et Species, p. 245.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 89.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 166.

Sigillaria alternans.
Andrae, Jahrb. d. Naturw. Vereines, Halle, 1850, p. 124.
Bronn, Index Palæont. p. 1143.
Brown, Quart. Journ. Geol. Soc. vol. v. p. 355.
Feistmantel, Palaeontographica, vol. xxiii. p. 245, pl. liv. fig. 3, pl. lv. figs. 1, 2, pl. lvi. figs. 1, 2, and pl. lvii. fig. 2.
„ Steinkf. v. Kralup in Böhm. pp. 14 and 34.
„ Steinkohl. u. Perm.-Ablager. p. 96.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 304.
„ Der Hangendflotzzug, p. 90, pl. v. fig. 4.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Geinitz, Flora d. Hainich.-Ebersdorfer. p. 62, pl. xiii. fig. 1.
„ Vers. d. Steinkf. in Sachsen, p. 47, pl. v. figs. 1–4, pl. viii. fig. 2.
Giebel, Deutschl. Petrefacten, p. 76.
Göppert, Neues Jahrbuch, 1864, p. 615.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 447.
„ Geol. of Pennsyl. vol. ii. p. 873.
Lindley and Hutton, Foss. Flora, vol. i. pl. lvi.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 111, pl. xxx. fig. 3.
Unger, Synop. Plant. Foss. p. 126.
„ Genera et Species, p. 250.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 166.
„ Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868 p. 89.

Syringodendron alternans.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 166.
Rost, De Fil. Ectypis, p. 15.
Sternberg, Vers. i. fasc. 4, p. 24, pl. lviii. fig. 2.

Sigillaria catenulata.
Bronn, Index Palæont. p. 1144.
Feistmantel, Palaeontographica, vol. xxiii. p. 246, pl. lix. fig. 2.
„ Jahrb. d. k. k. Geol. Reichsanst, vol. xxii. p. 304.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 873.
Lindley and Hutton, Foss. Flora, vol. i. pl. lviii.
Unger, Synop. Plant. Foss. p. 126.
„ Genera et Species, p. 250.

Sigillaria ? monostachya.
Lindley and Hutton, Foss. Flora, vol. i. pl. lxxii.

Sigillaria cactiformis.
Goldenberg, Flora Saræp. Foss. heft i. p. 26, pl. iv. fig. 1.

Rhytidolepis cordata.
Sternberg, Vers. i. fasc. 4, p. xxiii.

Rhytidolepis dubia.
Sternberg, Vers. i. fasc. 4, p. xxiii. pl. xxxi. fig. 1.

Palmacites sulcatus.
Schlotheim, Petrefactenkunde, p. 396, pl. xvi. fig. 1.

Syringodendron sulcatum.
Sternberg, Vers. i. fasc. 4, p. xxiv.

Palmacites canaliculatus.
Schlotheim, Petrefactenkunde, p. 396, pl. xvi. fig. 2.

Sigillaria parallela.
Unger, Neues Jahrbuch, 1842, p. 609.
„ Synop. Plant. Foss. p. 127.
„ Genera et Species, p. 250.

Sigillaria pulchella.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 117.
Römer, Palaeontographica, vol. ix. p. 41.

Syringodendron pulchellum.
Sternberg, Vers. i. fasc. 4, p. xxiv. pl. lii. fig. 2.

Remarks.—In the decorticated condition it is often very difficult to separate this species from *Sigillaria lævigata*.

Göppert mentions the occurrence of a stem of *Sigillaria alternans*, which was fully 5 feet in diameter and 15 feet in circumference. Another in the K. Mineralogischen Museum at Dresden measures 12 feet in circumference.*

Horizon.—Coal Measures.

Localities.—British. Somersetshire : Radstock.
Forma. Sigillaria catenulata :
Durham : Sunderland. Northumberland : Newcastle-on-Tyne. Wales (South) : Ebbw Vale, near Merthyr-Tydvil.
Other decorticated conditions :
Durham : Jarrow Colliery. Northumberland : Newcastle-on-Tyne. Worcestershire : Dudley.
Foreign. Silesia : Waldenburg. Westphalia : Buer ; Steele.

Sigillaria elongata, Brongniart.

Sigillaria elongata.
Andrae, Jahrb. d. Naturw. Vereines, Halle, 1850, p. 124.
Boulay, Terr. Houil. du Nord. de la France, p. 45.
Brongniart, Prodrome, p. 64.
„ Ann. d. Sciences Nat. vol. iv. p. 33, pl. ii. figs. 3, 4.
„ Hist. d. Végét. Foss. p. 473, pl. cxlv. and pl. cxlvi. fig. 2.
Bronn, Index Palæont. p. 1144.
Bunbury, Quart. Journ. Geol. Soc. vol. iii. 1847, p. 432.
Dawson, Acadian Geol. 2nd ed. 1868, p. 475.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 147.
„ Canadian Nat. vol. viii. p. 435.
„ Foss. Plants of Lower Carb. Canada, p. 35.
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 99.
„ Vers. d. Böhm. Kohlenab. p. 243, pl. liv. fig. 2.
Giebel, Deutschl. Petrefacten, p. 77.
Goldenberg, Flora Saræp. Foss. heft ii. p. 46, pl. viii. figs. 23–25.
Lesquereux, Geol. of Pennsyl, vol. ii. p. 873.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 108, pl. xxx. fig. 1.

* Neues Jahrbuch, 1864, p. 615.

Schimper, Traité d. Paléont. Végét. vol. ii. p. 91, pl. lxviii. fig. 8.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 140.
Unger, Neues Jahrbuch, 1842, p. 608.
„ Synop. Plant. Foss. p. 126.
„ Genera et Species, p. 247.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 89.
Zeiller, Végét. Foss. du Terr. Houil. p. 127.
Zeuschner, Neues Jahrbuch, 1838, p. 43.

Remarks.—Zeuschner mentions the occurrence of upright stems of *Sigillaria elongata* at Jaworzno and Niedzielisko, which were 20 feet high and from 1 to 5 feet in diameter.

Horizon.—Coal Measures.
Localities.—British. Staffordshire: Bentley. Wales (South): Big Coal Vein, Rhymney.

LEPIDOSTROBUS, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 87.

Lepidostrobus comosus, Lindley and Hutton.

Lepidostrobus comosus.
Bronn, Index Palæont. p. 632
Feidler, Die Foss. Früchte, p. 270.
Göppert and Berger, De Frucht. et Seminibus, p. 14.
Lindley and Hutton, Foss. Flora, vol. iii. pl. clxii.
Unger, Synop. Plant. Foss. p. 139.
„ Genera et Species, p. 269.

Lepidostrobus.
Brongniart, Hist. d. Végét. Foss. vol. ii. pl. xxv. fig. 5.

Remarks.—I have seen this cone attached to stems bearing *Lepidophloios* leaf-scars, and it is in fact, I believe, the cone of *Lepidophloios scoticus*, Kidston. It is at all events not referable to the genus *Lepidodendron*.

Geinitz (Vers. d. Steinkf. in Sachsen, p. 35) and Feistmantel (Vers. d. Böhm. Kohlenab. p. 210) unite it with *Lepidodendron rimosum*, but independently of the leaf-scars being those of *Lepidophloios*, *Lepidostrobus comosus* only occurs in the Lower Carboniferous, where *Lepidodendron rimosum* has not yet been discovered.

Schimper (Traité d. Paléont. Végét. vol. ii. p. 62) unites it doubtfully with *Lepidostrobus Geinitzii*, Schimper, from which, however, it seems quite distinct. Roehl (Foss. Flora d. Steink. Form. Westph. p. 142) unites *Lepidostrobus comosus* with *Lepidostrobus variabilis*, but this is also inadmissible.

Horizon.—Calciferous Sandstone Series.
Locality.—British. Midlothian: Burdiehouse, near Edinburgh.

Lepidostrobus Geinitzii, Schimper.

Lepidostrobus Geinitzii.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 62 (excl. syn. *L. comosus*).
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 175.

Lepidostrobus variabilis.
Feistmantel, Vers. d. Böhm. Kohlenab. pl. xliii., xliv. (xlv. fig. 1, ?).
Geinitz, Vers. d. Steinkf. in Sachsen, pl. ii. figs. 1, 3, 4.

Lepidostrobus.
Brongniart, Hist. d. Végét. Foss. vol. ii. pl. xxv. fig. 1.

Horizon.—Coal Measures.
Localities.—*British.* Lanarkshire: Airdrie. Staffordshire: Ipstones Park.
Foreign. (?) Silesia: Waldenburg.

Lepidostrobus Goldenbergii, Schimper.

Lepidostrobus Goldenbergii.
Lesquereux, Coal Flora of Pennsyl. p. 432.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 61, pl. lxi. figs. 3–5.

Lepidostrobus.
Brongniart, Hist. d. Végét. Foss. vol. ii. pl. xxiii. fig. 5, and pl. xxiv. fig. 6.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 220.

? Lepidostrobus variabilis.
Roehl, Foss. Flora d. Steink. Form. Westph. pl. vii. fig. 2, pl. xxix. fig. 17.

Horizon.—Coal Measures.
Locality.—*Foreign.* Bohemia.

Lepidostrobus fimbriatus, Kidston.

Lepidostrobus fimbriatus.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 543, pl. xxxi. figs. 2–4.

Horizon.—Calciferous Sandstone Series.
Locality.—*British.* Dumfriesshire: Glencartholm, Eskdale.

Lepidostrobus anthemis, König, sp.

Conophoroides anthemis.
König, Icones Fossilium Sectiles. pl. xvi. fig. 200.

Lepidostrobus radians.
Schimper, Traité. d. Paléont. Végét. vol. ii. p. 63.

Lepidostrobus.
Brongniart, Hist. d. Végét. Foss. vol. ii. pl. xxiii. fig. 6.

Remarks.—The original of König's *Conophoroides anthemis* is in the Collection. König's figure has been copied by Brongniart (Hist. d. Végét. Foss. vol. ii. pl. xxiii. fig. 6).

Horizon.—Coal Measures.
Locality.—*British.* Shropshire: Coalbrook Dale.

Lepidostrobus ovatifolius, Lesquereux.

Lepidostrobus ovatifolius.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 441, pl. xxx. fig. 2.
„ Coal Flora of Pennsyl. p. 438, pl. lxix. fig. 32.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 544.

Horizon.—Coal Measures.
Locality.—*Foreign.* Nova Scotia: Joggins (Presented by R. Brown, Esq.).

Lepidostrobus oblongifolius, Lesquereux.

Lepidostrobus oblongifolius.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 441, pl. xxx. fig. 3.
„ Coal Flora of Pennsyl. p. 437, pl. lxix. fig. 29.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 544.

Horizon.—Coal Measures.
Localities.—*British.* Wales (South): Llanelly, Carmarthen; Rhymney.

Lepidostrobus variabilis, Lindley and Hutton.

Lepidostrobus variabilis.
Boulay, Terr. Houil. du Nord. de la France, p. 39.

Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 162.
„ Canadian Nat. vol. viii. p. 451.
„ Foss. Plants, Lower Carb. Canada, p. 37.
„ Acadian Geol. 2nd ed. 1868, p. 488.
Feistmantel, Steinkf. v. Kralup in Böhm. pp. 14 and 32.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 598.
„ Vers. d. Böhm. Kohlenab. p. 218 (excl. figs.).
„ Jahrb. d. k. k. Geol. Reichsanst, vol. xxii. pp. 292, 299, 301, and 306.
„ Steinkohl. u. Perm.-Ablager, p. 94.
„ Der Hangendflötzzug, p. 91.
Feidler, Die Foss. Früchte, p. 270.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Göppert and Berger, De Fruct. et Seminibus, p. 14.
Hawkshaw, Trans. Geol. Soc. 2nd ser. vol. vi. p. 176, 1841.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. pp. 543 and 548.
„ in Cadell, Trans. Edinb. Geol. Soc. vol. iv. p. 335.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 876.
„ Coal Flora of Pennsyl. p. 434 (? pl. lxix. fig. 26).
Lindley and Hutton, Foss. Flora, vol. i. pl. x. and xi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. 1882, p. 32.
Roehl (*in part*), Foss. Flora d. Steink Form. Westph. p. 142.
Römer, Palaeontographica, vol. ix. 1862, p. 41.
Sandberger, Flora d. Ober Steinkf. im Bädischen Schwarzk. p. 2.
Schimper, Traité d. Palćont. Végét. vol. ii. p. 61.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.
Unger, Synop. Plant. Foss. p. 139.
„ Genera et Species, p. 270.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 91.
Zeiller, Flore Houil. des Asturies, p. 15.

Lepidostrobus ornatus.
Brongniart, Prodrome, p. 87.
Bronn, Index Palæont. p. 632.
„ Lethæa Geog. vol. i. part ii. p. 127, pl. vi. figs. 6-12.
Feistmantel, Steinkf. v. Kralup in Böhm. pp. 14 and 32.
Feidler, Die Foss Früchte, p. 270.
Fontaine and White, Perm. or Upper Carb. Flora, p. 17.
Göppert and Berger, De Fruct. et Seminibus, p. 14.
Hooker, Mem. Geol. Survey Great Britain, vol. ii. part ii. p. 448, pls. vii. viii. figs. 1–11.
Lesquereux, Coal Flora of Pennsyl. p. 440 (?).
„ Geol. of Pennsyl. vol. ii. p. 876.
Lindley and Hutton, Foss. Flora, vol. i. pl. xxvi.
Morris, Trans. Geol. Soc. 2 ser. vol. v. p. 488.
Renault, Cours d. Botan. Foss. 1882, p. 34, pl. vi. figs. 13, 14.
Schimper, Traité d. Palćont. Végét. vol. ii. p. 67.
Unger, Synop. Plant. Foss. p. 139.
„ Genera et Species, p. 269.

Lepidostrobus ornatus, var. *didymus.*
Bronn, Index Palæont. p. 632.
Lindley and Hutton, Foss. Flora, vol. iii. pl. clxiii.

Lepidostrobus.
Brongniart, Hist. d. Végét. Foss. vol. ii. pl. xxiv. fig. 4, pl. xxv. fig. 4.
Parkinson, Organic Remains, vol. i. pl. ix. fig. 1.

Remarks.—Under *Lepidostrobus variabilis*, Lindley and Hutton, is included

a number of cones, evidently belonging to different species, but which from the want of definite characters cannot at present be separated from each other.

Lepidostrobus ornatus is only a peculiar state of preservation of *Lepidostrobus variabilis*. In *Lepidostrobus ornatus* the upward rising bracts have been broken off from their horizontal basal portion, which bore the sporangia. The cone in this imperfect state shows on its outer surface a series of rhomboidal meshes, as figured by Lindley and Hutton, and Hooker.* What has been described as a seed by Lindley and Hutton in their description of pl. xxvi. is one of the sporangia.

The genera *Macrocystis*, Lesquereux, and *Polysporia*, Newberry,† have been founded on imperfectly preserved cones of the *Lepidostrobus ornatus* type, where the prolonged portion of the bract, which in well-preserved specimens extends outwards and upwards from its basal part, has been destroyed by decay. Such specimens are common at Coalbrook Dale and elsewhere in Britain; many of which, as well as others, showing their internal structure, are in the Collection. Some of the following examples, though here placed under *Lepidostrobus variabilis*, may probably be the cones of *Lepidodendron Sternbergii*.

Horizon.—Coal Measures.

? Lepidodendron Sternbergii:

Localities.—British. Durham: Sunderland. Gloucestershire: Forest of Dean. Northumberland: Felling Colliery, Newcastle-on-Tyne. Shropshire: Coalbrook Dale. Staffordshire: Netherton.

Lepidostrobus variabilis:

Durham: Sunderland. Midlothian: Burdiehouse, near Edinburgh (Calciferous Sandstone Series). Northumberland: Newcastle-on-Tyne. Monmouthshire: Near Blaernarvon.

Forma ornatus:

Shropshire: Coalbrook Dale. Staffordshire: Spring Vale, near Bilston. Worcestershire: Near Dudley.

Forms somewhat differing from the ordinary type of *L. variabilis:*

Lanarkshire: Monkland, near Airdrie. Warwickshire: Tamworth. Wales (South): Ebbw Vale; Merthyr-Tydvil.

Foreign.—Westphalia: Langendreer.

Lepidostrobus Brownii, Unger, sp.

Lepidostrobus Brownii.
Schimper, Traité d Paléont. Végét. vol. ii. p. 67, pl. lxii. figs. 13–20.

Triplosporites Brownii.
Unger, Genera et Species, p. 270.

Triplosporites.
Brown, Trans. Linn. Soc. vol. xx. p. 471, pls. xxiii. xxiv.

Remarks.—The example in the Collection is a transverse section of the original specimen.

Horizon.—Carboniferous.

Locality. ?

* See Hooker, Mem. Geol. Survey Great Britain, vol. ii. part ii. pl. viii. fig. 3.
† Report, Geol. Survey Ohio, vol. i. p. 360.

Lycopodiaceous spores.

Horizon.—Coal Measures.
Locality.—British. Fife : Fordel. Worcestershire : Forest of Wyre.

LEPIDOPHYLLUM, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 87.

Lepidophyllum majus, Brongniart.

Lepidophyllum majus.
Brongniart, Prodrome, p. 87.
Bronn, Index Palæont. p. 632.
Feistmantel, Steinkf. v. Kralup in Böhmen, pp. 14 and 31.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 595.
„ Vers. d. Böhm. Kohlenab. p. 215, pl. xlii. figs. 1–6.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292 and 306.
„ Steinkohl. u. Perm.-Ablager. p. 93.
Geinitz, Flora d. Hainich.-Ebersdorfer. pp. 17, 24, and 55, pl. xiv. figs. 12–14.
„ Vers. d. Steinkf. in Sachsen, p. 37, pl. ii. fig. 5.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 146.
Lesquereux, Coal Flora of Pennsyl. p. 449.
„ Report, Geol. Survey of Illinois, vol. ii. p. 456.
Renault, Cours d. Botan. Foss. 1882, p. 36.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 141.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 72.
Unger, Synop. Plant. Foss. p. 138.
„ Genera et Species, p. 268.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 176.

Lepidophyllum trinerve.
Brongniart, Prodrome, p. 87.
Bronn, Index. Palæont. p. 632.
Lindley and Hutton, Foss. Flora, vol. ii. pl. clii.
Unger, Synop. Plant. Foss. p. 139.
„ Genera et Species, p. 268.

Lepidophyllum binerve.
Lebour, Illustrations of Foss. Plants, p. 103, pl. lii

Lepidophyllum glossopteroides.
Göppert, Syst. Fil. Foss. p. 431, pl. xliv. fig. 3
Unger, Synop. Plant. Foss. p. 139.
„ Genera et Species, p. 269.

Lepidophyllum lanceolatum.
Lebour (non Brongniart), Illustrations of Foss. Plants, p. 105, pl. liii.

Glossopteris dubius.
Brongniart, Class. d. Végét. Foss. p. 32, pl. ii. fig. 4.

Horizon.—Coal Measures.
Locality.—Foreign. United States : Pennsylvania.

Lepidophyllum lanceolatum, Brongniart.

Lepidophyllum lanceolatum.
Brongniart, Prodrome, p. 87.
Bronn, Index Palæont. p. 632.
Dawson, Acadian Geol. 2nd ed. 1868, p. 489.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 163.
„ Canadian Nat. vol. viii. p. 451.
„ Foss. Plants Lower Carb. Canada, p. 38.

Kidston, Trans. Roy. Soc. Edinb. vol. xxx. pp. 544 and 548.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 875.
„ Report, Geol. Survey of Illinois, vol. ii. p. 556.
Lindley and Hutton, Foss. Flora, vol. i. pl. vii. figs. 3, 4.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 141, pl. xxviii. fig. 10.
Römer, Palaeontographica, vol. ix. p. 38, 1862.
Unger, Synop. Plant. Foss. p. 138.
„ Genera et Species, p. 268.

Lepidostrobus lanceolatus.
Lesquereux, Coal Flora of Pennsyl. p. 436, pl. lxix. fig. 38 (? refs. in part).

Horizon.—Calciferous Sandstone Series.
Locality.—British. Midlothian: Burdiehouse, near Edinburgh.

Lepidophyllum intermedium, Lindley and Hutton.

Lepidophyllum intermedium.
Bronn, Index Palæont. p. 632.
Dawson, Acadian Geol. 2nd ed. 1868, p. 489.
„ Quart. Journ Geol. Soc. vol. xxii. p. 163
„ Canadian Nat. vol. viii. p. 452.
„ Foss Plants Lower Carb. Canada, p. 37.
Lindley and Hutton, Foss. Flora, vol. i. pl. xliii. fig. 3.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 72.
Unger, Synop. Plant. Foss. p. 139.
„ Genera et Species, p. 269.

Horizon.—Coal Measures.
Locality.—Foreign. Saxony: Zwickau.

Lepidophyllum horridum, Feistmantel.

Lepidophyllum horridum.
Feistmantel, Vers. d. Böhm. Köhlenab. p. 217, pl. xlix. figs. 2, 3 (excl. pl. xlii. fig. 7).
„ Steinkohl. u. Perm.-Ablager. p. 93

Flabellaria Sternbergii.
Ettingshausen, Steinkf. v. Radnitz, p. 59, pl. xxiv. figs. 1, 2.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.

? Cyperites, sp.
Geinitz, Neues Jahrbuch, 1867, p. 280.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco. p. 32, pls. i. and v. fig. 3.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia: Stradonitz.

STIGMARIA, Brongniart, 1822.

Sur la Classification des Végéteaux Fossiles, p. 9.

Stigmaria ficoides, Brongniart.

Stigmaria ficoides (including vars. *reticulata, inæqualis, minor,* &c.).
Binney, Obs. Structure Foss. Plants, pt. 4, 1875, pp. 139 and 143, pls. xxi. and xxiv.
„ Quart. Journ. Geol. Soc. vol. xv. p. 76, pl. iv. 1859.
Boulay, Terr. Houil. du Nord de la France, p. 49.
Brongniart, Class. d. Végét. Foss. p. 9, pl. i. fig. 7.
„ Prodrome, p. 88.
Bronn, Index Palæont. p. 1200.

Bronn, Lethæa Geog. vol. i. part ii. p. 137, pl. vi¹. figs. 13–15, pl. vii. fig. 7.
Bunbury, Quart. Journ. Geol. Soc. vol. ii. p. 86 ; vol. iii. p. 433, 1847.
Corda, Flora d. Vorwelt. p. 32, pls. xii. xiii. figs. 1–8.
Dawson, Acadian Geol. 2nd ed. 1868, p. 475.
„ Geol. Survey of Canada, Reports, 1874–5, p. 196.
„ Quart Journ. Geol. Soc. vol. xv. p. 69, 1859, vol. xviii. p. 309, vol. xxii. p. 148, pl. xii. figs. 83–87, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 436.
„ Foss. Plants Lower Carb. Canada, p. 35.
Ebray, Végét. Foss. d. Terr. d. Transition, p. 17, pls. i.–v.
Eichwald, Lethæa Rossica, vol. i. p. 204.
„ Urwelt Russlands, heft i. p. 83.
Ettingshausen, Steinkf. v. Radnitz, p. 60.
„ Denks. k. Akad. Wiss. vol. xxv. p. 108.
Feistmantel, Steinkf. v. Kralup in Böhm. pp. 14 and 35.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 534, pl. xvii. fig. 36, and pp. 595 and 598.
„ Vers. d. Böhm. Kohlenab. p. 262.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, 299, 301, 304, and 306.
„ Steinkohl. u. Perm-Ablager. p. 100.
„ Der Hangendflötzzug, p. 91.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Geinitz, Flora d. Hainich.-Ebersdorfer. p. 59, pl. xi. figs. 1, 2.
„ Vers. d. Steinkf. in Sachsen, p. 49.
„ Neues Jahrbuch, 1867, p. 278.
„ (*var. inæquolis*) Flora d. Hainich.-Ebersdorfer. p. 59, pl. x. figs. 3–6, pl. xi. fig. 3.
„ (*var. minor*) Vers. d. Steinkf. in Sachsen, p. 49, pl. iv. fig. 6, pl. x. fig. 1.
Giebel, Deutsch. Petrefacten, p. 78.
Goldenberg, Flora Saræp. Foss. heft i. p. 31, pl. B. figs. 26–28, and 30, heft iii. p. 17, pl. xi. figs. 1, 2, 4, 16, and 17, pl. xiii. figs. 1–1*a*.
Gomes, Flora Foss. do Terr. Carbon. do Porto, do Serra do Bussaco, p. 26.
Göppert (*vars.*), Gatt. d. Foss. Pflanzen, lief. 1, 2, p. 13, pls. viii.–xvi.
„ Foss. Flora d. Perm. Form. p. 197.
„ Flora d. Sil. Devon. u. Unter Kohl. p. 540.
„ Zeitsch. d. Deut. Geol. Gesell. vol. iii. pp. 199 and 278, pls. xi.–xiii.
„ Foss. Flora d. Ubergangs. p. 245.
„ Neues Jahrbuch, 1847, p. 683.
Grand 'Eury (*var. minor*), Flore Carbon. du Dép. de la Loire, p. 170.
Heer, Foss. Flora d. Bären Insel, p. 45, pl. ix. fig. 5, pl. xii. figs. 1–6.
„ Steinkf. d. Artischen Zone, p. 5, pl. i. fig. 4, pls. ii. iii.
Hooker, Mem. Geol. Survey Gt. Brit. vol. ii. part ii. p. 431, pls. i. ii.
Kidston, Trans. Roy. Soc. Edinb. vol. xxx. p. 544, in Cadell. Trans. vol. iv. p. 335, Edinb. Geol. Soc.
Kimball, Flora from the Apalachian Coal Field, 1857, p. 15.
Lesquereux, Coal Flora of Pennsyl. p. 514, pl. lxxiv. figs. 1 and 11.
„ Report, Geol. Survey of Illinois, vol. ii. p. 447.
„ Geol. of Pennsyl. vol. ii. p. 870.
„ (*vars.*), Coal Flora of Pennsyl. p. 515, pl. lxxiv. figs. 2–4.
Lindley and Hutton, Foss. Flora, vol. i. pls. xxxi.–xxxvi. vol. iii pl. clxvi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Renault, Cours d. Botan. Foss. 1881, p. 155, pl. xix. fig. 7.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 119, pl. xxv.
Römer, Palaeontographica, vol. ix. pp. 10 and 44, pl. iii. fig. 7, 1862.

Rost, De Fil. Ectypis, p. 11.
Schimper (*vars.*), Végét. Foss. du Terr. de Transition d. Vosges, p. 325, pl. ii.–viii. (? ix.) and x.
„ (*vars.*), Traité d. Paléont. Végét. vol. ii. p. 114, pl. lxix.
Schmalhausen, Bull. Acad. Imp. Sc. St. Pétersb. vol. xxii. p. 291, pl. ii. fig. 9, viie. sér., vol. xxxi. p. 17, pl. iv. figs. 9–12.
Sternberg, Vers. i. fasc. 4, p. xxxviii.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 140–143.
„ (*var. inæqualis*), Culm Flora, heft ii. p. 407.
Tate, in Johnston's Nat. Hist. Eastern Borders, vol. i. p. 299, pl. xii., 1853.
Unger, Neues Jahrbuch, 1842, p. 608.
„ Synop. Plant. Foss. p. 116.
„ Genera et Species, p. 227.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 86, 1868.
„ (*vars.*), Foss. Flora d. jüng. Steink. u. d. Rothl. p. 173.
Zeiller, Végét. Foss. du. Terr. Houil. p. 140, pl. clxxiii. fig. 4.
„ (*var. minor and undulata*), Végét. Foss. du Terr. Houil. p. 141).

Stigmaria ficoides vulgaris.
Geinitz, Flora d. Hainich.-Ebersdorfer. pp. 17 and 24.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 170.
Heer, Flora Foss. Helv. lief. i. p. 43, pl. xvi. fig. 9.

Stigmaria anabathra.
Andrae, Jahrb. d. Naturw. Vereines, Halle, 1850, p. 124.
Bronn, Indèx Palæont. p. 1200.
Corda, Flora d. Vorwelt, p. 34, pl. xiv.
Ettingshausen, Steinkf. v. Radnitz, p. 60.
Goldenberg, Flora Saræp. Foss. heft i. p. 31, heft iii. p. 19. pl. xi. figs. 3, 5–15, 18–20, pl. xiii. figs. 2–19 (includes vars.)
Lesquereux, Geol. of Pennsylv. vol. ii. p. 870.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 122.
Unger, Genera et Species, p. 226.

Stigmaria Lindleyana.
Heer, Foss. Flora Spitzbergens, p. 14, pl. iv. figs. 1, 2.

Anabathra pulcherrima,
King, Edinb. New Phil. Journ. vol. xxxviii. pl. iv.
Tate, in Johnston's Nat. Hist. of the Eastern Borders, vol. i. 1853. p. 300
Witham, Inter. Struct. Foss. Vegetables, p. 40, pl. viii. figs. 7–12

Ficoidites furcatus.
Artis, Anted. Phytol. pl. iii.

Ficoidites major.
Artis, Anted. Phytol. pl. xviii.

Ficoidites verrucosus.
Artis, Anted. Phytol. pl. x.

Variolaria ficoides.
Sternberg, Vers. i. fasc. 1, pp. 22 and 24, pl. xii. figs. 1–3

Palmacites verucosus.
Schlotheim, Petrefactenkunde, p. 394, pl. xv. fig. 4.

Phytolithus plantites.
Martin, Petrificata Derbiensia, pls. xi., xii., and xii.*

Caulopteris gracilis.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cxli.

Stigmaria.
Parkinson, Organic Remains, vol. i. pl. iii. fig. 1.
King, Edinb. New Phil. Journ. vol. xxxviii. pl. v. figs. 1, 2.

Remarks.—In *Stigmaria* are placed the roots of *Sigillaria* and *Lepidodendron*, and perhaps those of other plants, as they at present cannot be correlated with the various stems to which they belong.

Numerous varieties of *Stigmaria ficoides* have been described. These are probably specifically distinct, and may represent the roots of different species, but for the present it is perhaps better to regard them as merely varieties of one species. The varieties *rimosa* and *stellata* are, however, so well marked, that I have treated them as species.

The distribution of *Stigmaria* and its varieties is co-extensive with that of *Sigillaria* and *Lepidodendron*. They are almost invariably found in the "underclays"—the old soils in which the carboniferous forests grew.

Caulopteris gracilis, Lindley and Hutton, as already suspected by Roehl,* seems to be undoubtedly the vascular cylinder of *Stigmaria*.

Horizon.—Throughout the whole of the carboniferous formation.

Localities.—British. Coal Measures. Durham: Jarrow. Lanarkshire: Carluke; Chapelhall, Airdrie (Presented by the British Association). Northumberland: Newcastle-on-Tyne. Shropshire: Coalbrook Dale. Somersetshire: Camerton; Radstock. Worcestershire: Dudley; Tenkbury; Forest of Wyre; Wyre Hill, near Bewdley, near Victoria Bridge; Upper Arley, Bewdley.

(*Calciferous Sandstone Series.*)

Fife: Grange Quarry, Burntisland.

Foreign. Coal Measures. Bohemia; Radnitz. Nova Scotia. Saxony: Zwickau. Silesia: Königshütte; Waldenburg. Westphalia: Wattenscheidt. United States: Pennsylvania; Scranton.

Var. **reticulata**, Göppert.

Horizon.—Coal Measures.
Localities.—British. Lanarkshire: Carluke.
Foreign. Silesia: Waldenburg.

Var. **minor**, Geinitz.

Horizon.—Coal Measures.
Locality.—British. Worcestershire: Bewdley.

Var.

Horizon.—Coal Measures.
Locality.—British. Wales (South): Abercarn.

Stigmaria stellata, Göppert.

Stigmaria stellata.
Eichwald, Lethæa Rossica, vol. i. p. 206, pl. xv. fig. 2.
Kidston in Cadell, Trans. Edinb. Geol. Soc. vol. iv. p. 335.
Renault, Cours d. Botan. Foss. 1881, p. 155.

Stigmaria ficoides var. stellata.
Dawson, Acadian Geol. 1868, 2nd ed. p. 476.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 148.
„ Canadian Nat. vol. viii. p. 436.

* Foss. Flora d. Steink. Form. Westph. p. 122.

Göppert, Gatt. d. Foss. Pflanzen. lief. 1, 2, p. 13, pl. x. fig. 12.
Lesquereux, Coal Flora of Pennsyl. p. 515, pl. lxxiv. fig. 4.

Remarks.—See also references to *Stigmaria ficoides*, where it is usually included as a variety.
Horizon.—Coal Measures.
Locality.—British. (?) (Presented by J. Thompson, Esq.).

Stigmaria rimosa, Goldenberg.

Stigmaria rimosa.
Goldenberg, Flora Saræp. Foss. heft iii. p. 15, pl. xii. figs. 3–6 (named *Stigmaria abbreviata* on plate).
Schimper, Traité d. Paléont. Végét. vol. ii. p. 116.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 86.

Horizon.—Coal Measures.
Locality.—British. Northumberland : Newcastle-on-Tyne.

LYGINODENDRON, Gourlie (1843 ?).

Proc. Phil. Soc. Glasgow, vol. i. no. 6, p. 108.

Lyginodendron Oldhamium, Williamson.

Lyginodendron Oldhamium.
Williamson, Phil. Trans. vol. clxiii. p. 404, pls. xxii.–xxvii., 1873.

Remarks.—The specimen in the Collection is a transparent section of the plant showing its internal structure.
It is a little doubtful if the fossils placed in *Lyginodendron* by Dr. Williamson are similar to those plants for which Gourlie founded the genus.

Horizon.—Coal Measures.
Locality.—British. Lancashire : Oldham.

HETERANGIUM, Corda, 1845.

Beiträge zur Flora der Vorwelt, p. 22.

Heterangium Grievii, Williamson.

Heterangium Grievii.
Williamson, Phil. Trans. vol. clxiii. p. 404, pls. xxviii.–xxxi. figs. 47 and 49, 1873.

Remarks.—This species is also represented in the Collection by a transparent section, which shows the internal structure of the fossil.
Horizon.—Calciferous Sandstone Series.
Locality.—British. Fife : Pettycur, near Burntisland.

CYCADACEÆ.

CORDAITES, Unger, 1850.

Genera et Species Plantarum Fossilium, p. 277.

Cordaites borassifolius, Sternberg, sp.

Cordaites borassifolius.
Andrae, Neues Jahrbuch, 1864, p. 175.
Boulay, Terr. Houil. du Nord. de la France, p. 49.
Dawson, Acadian Geol. 2nd ed. p. 490, 1868.

Dawson, Geol. Survey of Canada, Reports, 1874–5, pp. 192 and 196.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 164.
„ Canadian Nat. vol. viii. p. 453.
„ Foss. Plants, Lower Carb. Canada, pp. 33 and 37, pl. viii. fig. 74.
Eichwald, Lethæa Rossica, vol. i. p. 261.
Ettingshausen, Steinkf. v. Stradonitz, p. 16, pl. v. fig. 5.
„ Steinkf. v. Radnitz, p. 57.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 295, 299, 301 and 304.
„ Steinkohl. u. Perm.-Ablager. p. 103.
„ Steinkf. v. Kralup in Böhm. pp. 15 and 35.
„ Der Hangendflötzzug, p. 94.
Fontaine and White, Perm. or Upper Carb. Flora, pp. 18 and 20.
Geinitz, Neues Jahrbuch, 1867, p. 284.
„ Vers. d. Steinkf. in Sachsen, p. 41.
„ Neues Jahrbuch, 1867, p. 279.
Giebel, Deutschl. Petrefacten, p. 86.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 30.
Göppert, Foss. Flora d. Perm. Form. p. 160, pl. xxii. figs. 10, 11.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 217.
Heer, Flora Foss. Helv. lief. i. p. 54, pl. xvii. figs. 14–17.
„ Foss. Flora Spitzbergens, p. 22, pl. v. figs. 16, 17 (?).
„ Urwelt d. Schweiz, p. 15, figs. 16*a–b*.
Lesquereux, Bull. Mus. Compar. Zool. Harvard Col. vol. vii. 1882, p. 245.
„ Coal Flora of Pennsyl. p. 532, pl. lxxvi. fig. 3.
„ Geol. of Pennsyl. vol. ii. p. 877.
„ Report, Geol. Survey of Illinois, vol. ii. p. 443.
Newberry, Explor. Exped. from Santa Fé, &c., p. 18.
„ Ann. and Mag. Nat. Hist. 1883, p. 173.
Roehl, Foss. Flora d. Steink.-Form. Westph. p. 149.
Sandberger, Flora d. Ober. Steinkf. im Bädischen Schwarz. pp. 2, 4, and 5.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 142, 143.
Unger, Genera et Species, p. 277.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 93.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 201, pl. xviii. fig. 38.
Zeiller, Flore Houil. des Asturies, p. 16.
„ Végét. Foss. du Terr. Houil. p. 143.

Flabellaria borassifolia.
Brongniart, Prodrome, p. 121.
Bronn, Index Palæont. p. 499.
Corda, Flora d. Vorwelt, p. 44, pls. xxiv. xxv.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Sternberg, Vers. i. fasc 2, pp. 27 and 32, pl. xviii., fasc. 4, p. xxxiv.
Unger, Synop. Plant. Foss. p. 182.

Pycnophyllum borassifolium.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 190.

Remarks.—Of the numerous species of *Cordaites* which have been described, many are so imperfectly characterised that when guided only by descriptions it is all but impossible to discover in what they differ from each other.

The plants here placed under *Cordaites borassifolius*, Sternberg, sp., are characterised by the leaves having alternately a thick and a thin nerve. This plant is rare in Britain, the specimens from the Forest of Wyre being the only ones I have seen which can be referred to this species.

Associated with these examples from the Forest of Wyre are other

specimens in which the nerves are of equal thickness, and the same distance apart from each other, as are the thicker nerves in the specimens of *Cordaites borassifolius* from the same locality.

This equal-nerved variety doubtless originally possessed the alternate fine nerve of *Cordaites borassifolius*, which, however, from imperfect preservation has now disappeared from between the thicker nerves. In this condition, had the fossils not occurred with undoubted plants of *Cordaites borassifolius*, it would have been impossible to have distinguished them from *Cordaites palmæformis*, Göppert, sp., where the nerves are of equal thickness. I am therefore inclined to think that many of the records of *Cordaites palmæformis* from the Coal Measures are merely imperfectly preserved examples of *Cordaites borassifolius*.

The figure of *Cordaites palmæformis* given by Weiss (Foss. Flora d. jüng. Steink. u. d. Rothl. p. 199, pl. xviii. fig. 39) is probably referable to *Cordaites borassifolius*.*

The whole genus *Cordaites* requires a thorough revision.

Horizon.—Coal Measures.
Locality.—British. Worcestershire: Forest of Wyre.

Cordaites principalis, Germar, sp.

Cordaites principalis.
Feistmantel, Der Hangendflotzzug, p. 94.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 41, pl. xxi. figs. 1–6 (excl. fig. 22 ?).
Göppert, Foss. Flora d. Perm. Form. p. 159, pl. xxii. figs. 6–9.
Grand 'Eury, Flora Carbon. du Dép. de la Loire, p. 216.
Heer, Foss. Flora Spitzbergens, p. 22, pl. v. figs. 12–15 (?).
„ Flora Foss. Helv. lief. i. p. 55, pl. i. fig. 1, and figs. 12, 14, and 16 (excl. fig. 13).
Renault, Cours d. Botan. Foss. 1881, p. 92, pl. xii. fig. 6.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 163, pl. xx. figs. 1, 2.
Romer, Palaeontographica, vol. ix. p. 44, 1862.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 92.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 200.

Flabellaria principalis.
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 130.
Germar, Vers. v. Wettin u. Löbejun, p. 55, pl. xxiii.
Unger, Genera et Species, p. 332.

Pycnophyllum principale.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 191.

Remarks.—This is the only species of *Cordaites*, as far as I am aware, which has been observed to occur in the Coal Measures of Scotland, where it is very common. Gienitz unites with it as its probable fruit *Carpolithes Cordai*, Geinitz. This seed I have not yet discovered in the Scotch Coalfields.

What I am inclined to regard as the fruit of *Cordaites principalis* is the *Cardiocarpon Lindleyi*, Carruthers (= *Cardiocarpon acutum*, L. and H.), as this little fruit is almost invariably found associated with the leaves of this species. The example of *Cardiocarpon Lindleyi*, from the Coal Measures, Falkirk, which has been figured by Mr. Carruthers (Geol. Mag. vol. ix. 1872), was found in association with the leaves of *Cordaites principalis*.

* See remarks by Weiss, *loc. cit.*, on the various species of *Cordaites* included by him in this work.

Horizon.—Coal Measures.
Localities.—*British.* Lanarkshire : Carluke. Stirlingshire : The Cleuch, Falkirk.

Cordaites angulosostriatus, Grand 'Eury.

Cordaites angulosostriatus.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 217, pl. xix.
Renault, Cours d. Botan. Foss. 1881, p. 90, pl. xii. fig. 3.
Zeiller, Végét. Foss. du Terr. Houil. p. 144, pl. clxxv. figs. 2, 3.

Horizon.—Coal Measures.
Locality.—*British.* Wales (South) : Brithdir Vein, Rhymney (Presented by Coles Child, Esq.).

Cordaites lingulatus, Grand 'Eury.

Cordaites lingulatus.
Grand 'Eury, Flora Carbon. du Dép. de la Loire, p. 218, pl. xx.
Lesquereux, Coal Flora of Pennsyl. p. 533.
Renault, Cours d. Botan. Foss. 1881, p. 91, pl. xii. fig. 5.

Horizon.—Coal Measures.
Locality.—*Foreign.* France : Mines of La Chazotte, St. Étienne.

Cordaites obovatus, Carruthers, sp.

Noeggerathia obovata.
Carruthers, Geol. Mag. vol. vi. pl. vi. fig. 1, 1869.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 197.

Remarks.—The type of this species is in the Collection.
Horizon.—Carboniferous.
Locality.—*Foreign.* Brazil : Rio Grande do Sol.

Cordaites Mansfieldi, Lesquereux.

Cordaites Mansfieldi.
Lesquereux, Coal Flora of Pennsyl. vol. ii. p. 537, pl. lxxvi. figs. 4–4*b*, pl. lxxviii. figs. 1, 2, pl. lxxxvii. fig. 8.

Rhabdocarpus Mansfieldi.
Lesquereux, Coal Flora of Pennsyl. vol. ii. pl. lxxxv. fig. 21.

Horizon.—Coal Measures.
Locality.—*Foreign.* United States : Pennsylvania.

ANTHOLITHUS, Brongniart (emend.).

Prodrome d'une Histoire des Végétaux Fossiles, p. 128, 1828.
Schimper, Traité de Paléontologie Végétale, vol. iii. p. 564, 1874.

Antholithus parviflorus, Schimper.

Antholithus parviflorus.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 567.

Calamites Volkmanni.
Ettingshausen (*in part*), Steinkf. v. Stradonitz, p. 5, pl. v. figs. 1–3.

Horizon.—Coal Measures.
Locality.—*Foreign.* Bohemia : Stradonitz.

CARDIOCARPUS, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 87.

Cardiocarpus Lindleyi, Carruthers.

Cardiocarpon Lindleyi.
Carruthers, Geol. Mag. vol. ix. p. 56, 1872 (excl. *Cardiocarpon cornutum*, Dawson).

Cardiocarpon acutum.
Brongniart, Prodrome, p. 87.
Bronn, Index Palæont. p. 222.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. pl. xiii. fig. 25 (?).
Fiedler, Die Foss. Früchte, p. 274.
Giebel, Deutschl. Petrefacten, p. 84.
Lindley and Hutton, Foss. Flora, vol. i. pl. lxxvi.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 224.
Unger, Synop. Plant. Foss. p. 140.
„ Genera et Species, p. 271.

Cardiocarpon apiculatum.
Fiedler, Die Foss. Früchte, p. 274.
Göppert and Berger, Frucht. et Seminibus, p. 23, pl. ii. fig. 32.
Göppert, Foss. Flora d. Perm. Form. p. 176.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 224.
Unger, Genera et Species, p. 271.

Cardiocarpon operculatum.
Fiedler, Die Foss. Früchte, p. 274.
Giebel, Deutschl. Petrefacten, p. 84.
Göppert and Berger, Fruct. et Seminibus, p. 23, pl. ii. fig. 21.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 224.
Unger, Genera et Species, p. 271.

? Cardiocarpon obliquum.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 324, pl. xiii. fig. 25.

Carpolithes contractus.
Bronn, Index Palæont. p. 239.
Ettingshausen, Steinkf. v. Radnitz, p. 69.
Sternberg, Vers. i. fasc. 4, p. xl. pl. vii. fig. 7.
Unger, Synop. Plant. Foss. p. 256.
„ Genera et Species, p. 517.

Carpolithes morchellæformis.
Bronn, Index Palæont. p. 240.
Ettingshausen, Steinkf. v. Radnitz, p. 69.
Giebel, Deutschl. Petrefacten, p. 161.
Sternberg, Vers. i. fasc. 4, p. xli. pl. vii. fig. 5.
Unger, Synop. Plant. Foss. p. 257.
„ Genera et Species, p. 518.

Carpolithes acuminatus.
Bronn, Index Palæont. p. 238.
Ettingshausen, Steinkf. v. Radnitz, p. 69.
Giebel, Deutschl. Petrefacten, p. 160.
Sternberg, Vers. i. fasc. 4, p. xl. pl. vii. fig. 4.
Unger, Synop. Plant. Foss. p. 255.
„ Genera et Species, p. 516.

Carpolithes corculum.
Bronn, Index Palæont. p. 239.
Ettingshausen, Steinkf. v. Radnitz, p. 69.
Sternberg, Vers. i. fasc. 4, p. xl. pl. vii. fig. 6.

Unger, Synop. Plant. Foss. p. 256.
„ Genera et Species, p. 517.

Cordaianthus Lindleyi.
Renault, Cours d. Botan. Foss. 1881, p. 95, pl. xiii. fig. 9.

Cordaispermum Lindleyi.
Renault, Cours d. Botan. Foss. 1881, p. 103, pl. xiv. fig. 8.

Antholithus Lindleyi.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 566.

Antholithes Pitcairniæ.
Bronn, Index Palæont. p. 82.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 293.
„ Steinkohl u. Perm-Ablager. p. 104.
Lindley and Hutton, Foss. Flora, vol. ii. pl. lxxxii.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489.
Renault, Cours d. Botan. Foss. 1881, p. 94, pl. xiii. fig. 7.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 165, pl. vii. fig. 5.
Unger, Genera et Species, p. 499.

Botryoconus Pitcairniæ.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 280.

Remarks.—Feistmantel (Jahrb. d. k. k. Geol. Reichsanst. vol. xxii, p. 293, 1872) unites *Antholithes Pitcairniæ* with *Cordaites borassifolius*. As far as I am aware, the British specimens of Lindley and Hutton's plant are uniformly associated with *Cordaites principalis*, Germar, sp. *Cordaites borassifolius* has not yet been discovered in Britain in any locality where *Antholithes Pitcairniæ* has been found. However, it is quite possible that imperfectly preserved specimens of the fructifications of other species of *Cordaites* may be indistinguishable from the example that Lindley and Hutton have figured and described as *Antholithes Pitcairniæ*, which does not show the fruit, but only portions of the bracts and the axis to which the fruit has been attached.

Horizon.—Coal Measures.
Localities.—British. Northumberland: Newcastle-on-Tyne. Stirlingshire: The Cleuch, Falkirk.

Cardiocarpus subacutus, Grand 'Eury, sp.

Samaropsis subacuta.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 281, pl. xxxiii. fig 5.

Remarks.—This species is closely related to *Cardiocarpus Lindleyi*, Carruthers.
Horizon.—Coal Measures.
Locality.—British. Worcestershire: Forest of Wyre.

Cardiocarpus anomalus, Morris, sp.

Cardiocarpon anomalum.
Carruthers, Geol. Mag. vol. ix. p. 57, 1872.

Antholithes anomalus.
Bronn, Index Palæont. p. 82.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489, pl. xxxviii. figs. 5, 6.

Antholithus anomalus.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 566.

Horizon.—Coal Measures.
Locality.—British. Derbyshire.

Cardiocarpus Gutbieri, Geinitz.

Cardiocarpus Gutbieri.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 301.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 236.
Lesquereux, Coal Flora of Pennsyl. p. 549, pl. lxxxiii. fig. 8 (excl. figs. 9, 10, 11 (?).

Cardiocarpon Gutbieri.
Fiedler, Die Foss. Früchte, p. 275.
Feistmantel, Steinkohl. u. Perm.-Ablager, p. 94.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 39, pl. xxi. figs. 23–25.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 222.

Cordaispermum Gutbieri.
Renault, Cours d. Botan. Foss. 1881, p. 103, pl. xiv. fig. 7.

Horizon.—Coal Measures.
Locality.—British. Worcestershire : Tipton, near Dudley.

CYCLOCARPUS, Göppert and Fiedler, 1857.

Uber Die Fossilen Früchte der Steinkohlenformation, Nova Acta Acad. Cæs. Leop. Carol. Nat. Cur. vol. xxvi. p. 292.

Cyclocarpus nummularius, Göppert and Fiedler.

Cyclocarpus nummularius.
Weiss, Verhandl. d. Natur. Vereines d. Preuss Rheinl. u. Westph. 1868, p. 94.

Cyclocarpon nummularium.
Göppert and Fiedler, Die Foss. Früchte, p. 292, pl. xxviii. fig. 47.

? Cyclocarpus intermedius.
Göppert, Foss. Flora d. Perm. Form. p. 147, pl. xxvii. figs. 12–15, pl. xxix. figs. 7, 13–16.

? Cardiocarpus intermedius.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 222.

Remarks.—I am inclined to think that *Cyclocarpus intermedius*, Göppert, is not specifically distinct from this species.

A specimen from Staffordshire, which I place under *Cyclocarpus nummularius*, is about an inch and a quarter in diameter. Otherwise than in its size, it does not differ from the description of this species as given by Göppert and Fiedler.

Horizon.—Coal Measures.
Localities.—British. Staffordshire. Yorkshire : Cloughton.

Cyclocarpus, sp.

Horizon.—Coal Measures.
Locality.—British. Northumberland : Newcastle-on-Tyne.

NOEGGERATHIA, Sternberg, 1820.

Versuch einer geognostisch-botanischen Darstellung der Flora der Vorwelt. vol. i. fasc. 2, p. 28.

Noeggerathia foliosa, Sternberg.

Noeggerathia foliosa.
Brongniart, Prodrome, p. 121.
Bronn, Index Palæont. p. 815.
Ettingshausen, Steinkf. v. Radnitz, p. 58.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 266, pl. lxii. figs. 1, 2, 8.

Feistmantel, Zeitsch. d Deut. Geol. Gesell. vol. xxvii. p. 78, pl. v. figs. 1 and 3.
„ Steinkohl. u. Perm-Ablager. p. 101, pl. ii. fig. 1.
Geinitz, Neues Jahrbuch, 1865, p. 391, pl. iii. figs. 1, 2.
Giebel, Deutschl. Petrefacten, p. 38.
Göppert, Gatt. d. Foss. Pflanzen, lief. 5, 6, p. 108, pl. xii. fig. 1.
Renault, Cours d. Botan. Foss. 1881, p. 65, pl. vii. fig. 6.
Schimper, Traité d. Paléont. Végét. vol ii. p. 129.
Sternberg, Vers. i. fasc. 2, pp. 28 and 33, pl. xx., fasc. 4, p. xxxvi.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 142.
„ Morph. u. Syst. der Culm u. Carbonfarne, p. 13, figs. 3, 4.
Unger, Synop. Plant. Foss. p. 57.
„ Genera et Species, p. 103

Noeggerathiaestrobus Bohemicus.
Feistmantel, Vers. d. Böhm. Kohlenab. p. 270, pl. lxi. fig. 5.

Remarks.—Stur (Morph. u. Syst. d. Culm. und Carbonfarne, p. 12) includes *Noeggerathia* in the order *Ophioglossaceæ*, but from the structure of the fruit of *Noeggerathia foliosa* this classification appears to me inadmissible, and I therefore prefer to retain the genus in the *Cycadaceæ*.

Horizon.—Coal Measures.
Locality.—Foreign. Bohemia : Radnitz.

Noeggerathia (?) æqualis, Göppert.

Noeggerathiæ æqualis.
Göppert, Tchihatcheff's Voyage dans l'Altai, p. 385, pl. xxvii. fig. 7.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 131.

Horizon.—Carboniferous.
Locality.—Foreign. Russia : Altai.

PSYGMOPHYLLUM, Schimper, 1870.

Traité de Paléontologie Végétale, vol. ii. p. 192.

Psygmophyllum flabellatum, Lindley and Hutton, sp.

Psygmophyllum flabellatum.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 193.

Noeggerathia flabellata.
Bronn, Index Palæont. p. 815.
Dawson, Acadian Geol. 2nd ed. 1868, p. 481.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 153.
„ Canadian Nat. vol. viii. p. 442.
„ Foss. Plants Lower Carb. Canada, p. 36.
Lindley and Hutton, Foss. Flora, vol. i. pl. xxviii., xxix.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 19.
Unger, Synop. Plant. Foss. p. 57.
„ Genera et Species, p. 103.

Ginkgophyllum flabellatum.
Renault, Cours d. Botan. Foss. 1881, p. 65, pl. vii. fig. 5.

Horizon.—Coal Measures.
Locality.—British. Durham : Sunderland.

GENERA INCERTÆ SEDIS.

RHABDOCARPUS, Göppert and Berger, 1848.

De Fructibus et Seminibus ex Formatione Lithanthracum, p. 20.

Rhabdocarpus multistriatus, Presl, sp.

Rhabdocarpus multistriatus.
Lesquereux, Coal Flora of Pennsyl. p. 578, pl. lxxxv. figs. 22, 23.

Carpolithes multistriatus.
Bronn, Index Palæont. p. 240.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Göppert and Berger, De Fruct. et Seminibus, p. 16.
Lesquereux, Geol. of Pennsyl. 1858, p. 877.
„ Report, Geol. Survey Illinois, vol. ii. p. 460, pl. xlvi. fig. 2.
„ Sternberg, Vers. ii. pl. xxxix. figs. 1, 2.
Unger, Synop. Plant. Foss. p. 254.
„ Genera et Species, p. 515.

Rhabdocarpus carinatus.
Lesquereux, Coal Flora of Pennsyl. p. 579.
Newberry, Report, Geol. Survey Ohio, vol. i. part ii. p. 376, pl. xliv. fig. 3.

Rhabdocarpus apiculatus.
Newberry, Report, Geol. Survey Ohio, vol. i. part ii. p. 377, pl. xliv. fig. 6.

? Rhabdocarpus insignis.
Dawson, Acadian Geol. 2nd ed. p. 478, fig. 173*g*, 1868.

? Rhabdocarpus oblongatus.
Fontaine and White, Perm. or Upper Carb. Flora, p. 98, pl. xxxvii. figs. 8, 9.

Remarks.—The specimen I identify as *Rhabdocarpus multistriatus* is about 1 inch long and $\frac{3}{8}$ inch broad at its widest part, which is about one-third of an inch above its base. On the exposed surface of the fruit there appear to be nine or ten longitudinal ribs, which are alternately strong and weak. The specimen is intermediate in size between *Rhabdocarpus multistriatus* and *Rhabdocarpus lineatus*, Göppert and Berger (De Fruct. et Seminibus, pl. i. fig. 18). It agrees well with the figures of *Rhabdocarpus multistriatus* given by Lesquereux (Coal Flora of Pennsyl. pl. lxxxv. figs. 22, 23), but is slightly less. This difference in size is not apparently specific.

Some of the figures of *Trigonocarpum Schulzianum* given by Fiedler (Foss. Früchte d. Steink. Form.), especially his figures on pl. xxvi., approach very closely to *Rhabdocarpus multistriatus*, if they are really distinct from it. In any case it is difficult to understand how this fruit should be retained (as figured by Fiedler) in the genus *Trigonocarpus*. The greater prominence of three of the angles, as mentioned by him in his description, can scarcely be said to agree with his figures.

Rhabdocarpus carinatus and *Rhabdocarpus apiculatus*, Newberry, do not seem to differ from *Rhabdocarpus multistriatus*, and with this last-mentioned species, perhaps *Rhabdocarpus insignis*, Dawson, and *Rhabdocarpus oblongatus*, Fontaine and White, should also be united.

Horizon.—Coal Measures.
Locality.—*British.* Staffordshire: Beggar's Bank, Longport (Presented by A. Smith Woodward, Esq.).

Rhabdocarpus Künssbergii, Gutbier, sp.

Cardiocarpon Künssbergi.
Bronn, Index Palæont. p. 222.
Feistmantel, Der Hangendflötzzug, p. 98.
Fiedler, Die Foss. Früchte, p. 274.
Geinitz, Flora d. Hainich-Ebersdorfer, pp. 24 and 49.
„ Vers. d. Steinkf. in Sachsen, p. 39, pl. xxii. figs. 22, 23.
Gutbier in Genitz, Gaea v. Sachsen, p. 92.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 221.
Unger, Genera et Species, p. 272.

Cardiocarpum Künssbergi.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Vers. d. Böhm. Kohlenab. p. 222.
„ Steinkohl. u. Perm-Ablager. p. 94.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 303.

? Carpolithes marginatus.
Artis, Anted. Phytol. pl. xxii.-c. (excl. B.)

Horizon.—Coal Measures.
Locality.—Foreign. Saxony: Zwickau.

Rhabdocarpus (?) disciformis, Sternberg, sp.

Rhabdocarpus disciformis.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 205, pl. xi. fig. 4*a*, pl. xviii. figs. 2–8, 15, 16.

Carpolithes disciformis.
Bronn, Index Palæont. p. 239.
Ettingshausen, Steinkf. v. Radnitz, p. 68.
Göppert, De Fruct. et Seminibus, p. 16.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 240, pl. xxiv. fig. 7.
Heer, Flora Foss. Helv. lief. i. p. 58, pl. xvii. figs. 19, 20.
Sternberg, Vers. i. fasc. 4, p. xl. pl. vii. fig. 13.
Unger, Synop. Plant. Foss. p. 256.
„ Genera et Species, p. 517.

? Rhabdocarpus ovalis.
Fiedler, Die Foss. Früchte, p. 287, pl. xxviii. fig. 34.

? Carpolithes obscurus.
Bronn, Index Palæont. p. 240.
Sternberg, Vers. ii. pl. lviii. (last figure to right hand of plate).
Unger, Synop. Plant. Foss. p. 255.
„ Genera et Species, p. 516.

? Carpolithes petiolatus.
Göppert and Berger, De Fruct. et Seminibus, p. 25, pl. ii. fig 27.
Horizon.—Coal Measures.
Locality.—British. Worcestershire: Forest of Wyre.

Rhabdocarpus (?) Bockschianus, Göppert and Berger.

Rhabdocarpus Bockschianus.
Fiedler, Die Foss. Früchte, p. 272.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 42, pl. xxii. figs. 8, 9.
Giebel, Deutsch. Petrefacten, p. 93.
Göppert and Berger, De Fruct. et Seminibus, p. 21, pl. i. figs. 13, 14.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 158, pl. xxii. fig. 5.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 217.
Unger, Genera et Species, p. 306.

Remarks.—It is with some uncertainty that I place the fruit from near Bewdley under this species.

I am inclined to think *Rhabdocarpus Bockschianus* is only a *Trigonocarpus* partially enclosed in its pericarp.* The figures of this species given by Geinitz do not perhaps lead one to this conclusion, but those given by Göppert and Berger indicate that this is the true nature of their fossil.

Horizon.—Coal Measures.

Locality.—British. Worcestershire, near Bewdley.

CARPOLITHUS, Sternberg.

Versuch einer geognostisch-botanischen Darstellung der Flora der Vorwelt. vol. ii. p. 208.

Carpolithus ovoideus, Göppert and Berger, sp.

Carpolithus ovoideus.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 239.

Rhabdocarpus (?) ovoideus.
Weiss, Foss. Flora d. jüng. Steink. u. d. Rothl. p. 206, pl. xvii. fig. 4, pl. xviii. figs. 10–14, 18–21.

Rhabdocarpus ovoideus.
Göppert, Foss. Flora d. Perm. Form. p. 173, pl. xxvii. figs. 9, 10.
Göppert and Berger, De Fruct et Seminibus, p. 22, pl. i. fig. 17.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 218.
Unger, Genera et Species, p. 307.

Rhabdocarpus Germanicus.
Göppert, Foss. Flora d. Perm. Form. p. 270, pl. lxiv. fig. 14.

Carpolithes membranaceus.
Göppert, Foss. Flora d. Perm. Form. p. 178, pl. xxix. figs. 19–21.
Göppert and Berger, De Fruct. et Seminibus, p. 25, pl. ii. figs. 19 and 20*a*, *b*.
Unger, Genera et Species, p. 512.

Carpolithes ellipticus.
Bronn, Index Palæont. p. 239.
Göppert and Berger, De Fruct. et Seminibus, p. 16.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 239.
Sternberg, Vers. i. fasc. 4, p. xl. pl. vii. fig. 1.
Unger, Synop. Plant. Foss. p. 257.
„ Genera et Species, p. 517.

? Carpolithes sepelitus.
Göppert and Berger, De Fruct. et Seminibus, p. 17.
Sternberg, Vers. ii. p. 208, pl. xlvii. fig. 6*a*.
Unger, Synop. Plant. Foss. p. 254.
„ Genera et Species, p. 515.

? Carpolithes regularis.
Göppert and Berger, De Fruct. et Seminibus, p. 17.
Sternberg, Vers. i. fasc. 4, p. xl. pl. vii. fig. 2.
Unger, Synop. Plant. Foss. p. 257.
„ Genera et Species, p. 518.

? Antholithes Rhabdocarpi.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 149, pl. vii. fig. 30.

? Antholithes.
Newberry, Report, Geol. Survey of Ohio, vol. i. part ii. pl. xli. fig. 2.

* See p. 218.

Horizon.—Coal Measures.
Locality.—British. Worcestershire : Forest of Wyre.

Carpolithus, sp.
Horizon.—Coal Measures.
Localities.—British. Lanarkshire : Airdrie. Worcestershire : Forest of Wyre.

TRIGONOCARPUS, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 137.

Trigonocarpus Noeggerathi, Sternberg, sp.

Trigonocarpus Noeggerathi.
Boulay, Terr. Houil. du Nord de la France, p. 50.
Brongniart, Prodrome, p. 137.
Bronn, Index Palæont. p. 1282 (excl. ref. Lindley and Hutton).
„ Lethæa Geog. vol. i. part ii. p. 147, pl. vi[1]. fig. 16 (excl. ref. L. and H.).
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 150, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 439.
„ Foss. Plants Lower Carb. Canada, p. 38.
Fiedler, Die Foss. Früchte, pp. 271 and 277 (ref. and syn. in part).
Giebel, Deutschl. Petrefacten, p. 92.
Göppert, Foss. Flora d. Perm. Form. p. 167 (in part).
Göppert and Berger, De Fruct. et Seminibus, pp. 15 and 18, pl. i. figs. 1, 2 (excl. ref. L. and H.).
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 183 (? pl. xv. fig. 1).
Lesquereux, Coal Flora of Pennsyl. p. 584, pl. lxxxv. fig. 1 (excl. ref. L. and H.).
Schimper, Traité d. Paléont. Végét. vol. ii. p. 214 (excl. ref. L. and H.).
Steininger, Beschreibung der Eifel, p. 138.
Unger, Synop. Plant. Foss. p. 173 (excl. ref L. and H.).
„ Genera et Species, p. 303 (excl. ref. L. and H.).
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 93.
„ Foss. Flora d. jüng. Steink. u. d. Rothl. p. 204 (excl. ref. L. and H.).

Palmacites Noeggerathi.
Sternberg, Vers. i. fasc. 4, p. xxxv. pl. lv. figs. 6, 7.

Trigonocarpum areolatum.
Göppert and Berger, De Fruct. et Seminibus, p. 19, pl. i. figs. 3, 4.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 215.
Unger, Genera et Species, p. 304.

Remarks.—All the figures given by Lindley and Hutton in their Fossil Flora as *Trigonocarpum Noeggerathi* are referable to the fruits figured without name by Parkinson in his Organic Remains, vol. i. pl. vii. figs. 6–8, to which Brongniart in his Prodrome applied the name of *Trigonocarpum Parkinsoni*.

Horizon.—Coal Measures.
Localities.—British. Lancashire : near Oldham. Worcestershire : Forest of Wyre ; Dudley.
Foreign. Rhenish Prussia : Saarbrück.

Trigonocarpus Dawesii, Lindley and Hutton.

Trigonocarpus Dawesii.
Bronn, Index Palæont. p. 1282.
Fiedler, Die Foss. Früchte, pp. 271 and 286, pl. xxvii. fig. 29.

Giebel, Deutschl. Petrefacten, p. 92.
Göppert, Foss. Flora d. Perm. Form. p. 168.
Göppert and Berger, De Fruct. et Seminibus, p. 14.
Lesquereux, Coal Flora of Pennsyl. p. 586, pl. lxxxv. figs. 2, 3 (? fig. 25).
Lindley and Hutton, Foss. Flora, vol. iii. pl. ccxxi.
Morris, Trans. Geol. Soc. 2nd ser. vol. v. p. 489 (?)
Schimper, Traité d. Paléont. Végét. vol. ii. p. 215.
Unger, Synop. Plant. Foss. p. 174.
„ Genera et Species, p. 305.

Horizon.—Coal Measures.
Locality.—British. Lancashire : Wigan.

Trigonocarpus Parkinsoni, Brongniart.

Trigonocarpus Parkinsoni.
Brongniart, Prodrome, p. 137.
Bronn, Index Palæont. p. 1282.
Fiedler, Die Foss. Früchte, p. 286.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 43, pl. xxii. figs. 17-20 (excl. syn. *C. sulcata*, L. and H.).
Göppert, Foss. Flora d. Perm. Form. p. 168.
Göppert and Berger, De Fruct. et Seminibus, p. 15.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 183.
Lesquereux, Coal Flora in Pennsyl. p. 589, pl. lxxxv. figs. 9, 10.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 160, pl. xxii. fig. 11.
Sandberger, Flora d. Ober. Steink. im Bädischen Schwarz, pp. 3 and 4.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 214 (ref. in part).
Unger, Synop. Plant. Foss. p. 173.
„ Genera et Species, p. 305.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 93.

Trigonocarpus subcylindricus.
Lesquereux, Coal Flora of Pennsyl. In explan. to pl. lxxxv. figs. 9, 10 (= *T. Parkinsoni*).

Trigonocarpum Noeggerathi.
Fiedler (*in part*), Die Foss. Früchte, p. 277.
Göppert and Berger (*in part*), De Fruct. et Seminibus, p. 18.
? Gomes, Foss. Flora du Terr. Carbon. do Porto, Serra do Bussaco, p. 34, pl. iv. figs. *a b*.
Lindley and Hutton, Foss. Flora, vol. ii. pl. cxlii. *c*, vol. iii. pl. cxciii. *b*, figs. 1–4, pl. ccxxii. figs. 2 and 4.
Schimper (*in part*), Traité d. Paléont. Végét. vol. ii. p. 214.
Unger (*in part*), Synop. Plant. Foss. p. 173.
„ (*in part*), Genera et Species, p. 303.

Trigonocarpum olivæforme.
Bronn, Index Palæont. p. 1282.
Fiedler, Die Foss. Früchte, pp. 271 and 282, pl. xxvii. fig. 28.
Göppert and Berger, De Fruct. et Seminibus, p. 15.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 460.
Lindley and Hutton, Foss. Flora, vol. iii. pl. ccxxii. figs. 1 and 3.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 215.
Unger, Synop. Plant. Foss. p. 174.
„ Genera et Species, p. 305.

Trigonocarpus olivæformis.
Göppert, Foss. Flora d. Perm. Form. p. 168.
Lesquereux, Coal Flora of Pennsyl. p. 590, pl. lxxxv. figs. 7, 8.

Carpolithes amygdalæformis.
Bronn, Index Palæont. p. 238.
Göppert and Berger, De Fruct. et Seminibus, p. 15, pl. i. fig. 12.

Rhabdocarpus amygdalæformis.
Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 292.
Fiedler, Die Foss. Früchte, p. 272.
Fontaine and White, Perm. or Upper Carb. Flora, p. 18.
Geinitz, Vers. d. Steinkf. in Sachsen, p. 43, pl. xxii. figs. 10, 11.
Göppert and Berger, De Fruct. et Seminibus, p. 21, pl. i. fig. 12.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 877.
„ Coal Flora of Pennsyl. p. 581, pl. lxxxv. figs. 27 and 28 (?).
Schimper, Traité d. Paléont. Végét. vol. ii. p. 217.
Unger, Genera et Species, p. 306.

? Trigonocarpus Menzelianus.
Lesquereux, Coal Flora of Pennsyl. p. 590, pl. lxxxv. fig. 11.

Carpolithes alatus.
Bronn, Index Palæont. p. 238.
Göppert and Berger, De Fruct. et Seminibus, p. 15.
Lindley and Hutton, Foss. Flora, vol. ii. pl. lxxxvii., vol. iii. pl. ccx. *b*.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 226.
Unger, Synop. Plant. Foss. p. 255.
„ Genera et Species, p. 516.

? Trigonocarpum rostellatum.
Lesquereux, Report, Geol. Survey of Illinois, vol. ii. p. 460, pl. xlvi. fig. 6.

Trigonocarpon.
Hooker and Binney, Phil. Trans. cxlv. p. 149, pl. iv. 1855.

? Rhabdocarpus Bockschianus, ante p. 214.

Phytolithus.
Martin, Petrificata Derbiensia, pl. xxi. figs. 1–3.

Rhabdocarpos.
Parkinson, Organic Remains, vol. i. pl. vii. figs. 6–8.
Geinitz, Vers. d. Steinkf. in Sachsen, pl. xxii. fig. 15 *a*, *b*.

Remarks.—This fruit occurs under three different states of preservation, each of which has been placed in a distinct *genus*. The earliest figured form is *Trigonocarpus Parkinsoni*, where the little nuts are isolated and still retain their original shape. Specimens so preserved occur at times very plentifully at Ardeer Sandstone Quarry, near Stevenston, Ayrshire, and at Peel Quarry, Bolton, Lancashire.

When the stone is split, specimens so preserved frequently fall out of the matrix, leaving a cavity which is usually lined with a layer of coal—the remains of the pericarp. When they remain attached to the sandstone, they are commonly surrounded by a border of a similar coaly matter. The upper extremity of the surrounding coaly matter is frequently produced into a neck, which has a depressed furrow, similar to what is seen in Göppert and Berger's figure of *Rhabdocarpus Bockschianus* (*loc. cit.* pl. i. fig. 13), which in their plate is represented with the apex directed downwards.* When these nuts are preserved in the ordinary grey shales which are associated with the coal seams, they are generally more or less compressed, and the remains of the pericarp is seldom preserved, but when present forms a narrow surrounding border, which, like the fruit itself, is often finely striated longitudinally. In this condition, *Trigonocarpus Parkinsoni* is the *Rhabdocarpus amygdalæformis* of Göppert and Berger (*loc. cit.* pl. i. fig. 12). The complete fruit has been figured by Lindley and Hutton in their Fossil Flora (vol. ii. pl. lxxxvii.) as *Carpolithes alatus*. Here the pericarp is seen enclosing the

* See ante p. 214.

nut. In their fig. 2 the seed is clearly exhibited, but in some examples I have seen it more perfectly shown, when even the more prominent angles were visible. In fig. 3 is shown the neck-like canal, similar to what is figured by Göppert and Berger in *Rhabdocarpus Bockschianus* (*loc. cit.* pl. i. figs. 13, 14). These various forms and conditions of *Trigonocarpus Parkinsoni* I have traced through a large series of specimens, and am led to conclude that the three fruits, *Trigonocarpus Parkinsoni*, *Rhabdocarpus amygdalæformis*, and *Carpolithes alatus* are all different states of the same fossil. In *Trigonocarpus Parkinsoni* three of the angles are very prominent, the other three very slight and seldom observable. When the more delicate ridges have become obliterated, the specimens form the *Trigonocarpus olivæformis*, Lindley and Hutton.

In the Collection there is a large sandstone slab, measuring 21 inches by 15 inches, from Peel Quarry, Bolton, the original locality for *Trigonocarpus olivæformis*, on which is seen over 400 of these little fossils, either represented as sandstone casts, surrounded by a coaly envelope, or as shallow coal-lined hollows from which the seeds have fallen.

Trigonocarpus Noeggerathi, with which Lindley and Hutton identify in error *Trigonocarpus Parkinsoni*, is a larger and much more uncommon fruit in Britain.

Trigonocarpus oblongus, Lindley and Hutton (Fossil Flora, pl. cxciii. *c*), is also, perhaps, only a specimen of *Trigonocarpus Parkinsoni*, with part of the pericarp still adhering to the nut.

An example from Oldham in the Collection shows a very similar appearance to Lindley and Hutton's figure, and it occurred along with typical specimens of *Trigonocarpus Parkinsoni:* thus I suspect *Trigonocarpus oblongus* is only *Trigonocarpus Parkinsoni*, with part of the pericarp slightly split, but still adhering to the seed.

Rhabdocarpus clavatus, Geinitz (Vers. d. Steinkf. in Sachsen, p. 42, pl. xxii. figs. 12–14), is likewise, I am inclined to think, referable to *Trigonocarpus Parkinsoni*. The original figures of this species given by Sternberg under the name of *Carpolithes clavatus* (Vers. i. pl. vii. fig. 14*a–b*), are not so like *Trigonocarpus Parkinsoni* as Geinitz's rendering of Sternberg's species, therefore I would not in the meantime propose to unite *Carpolithes clavatus*, Sternberg, with *Trigonocarpus Parkinsoni*, but specimens similar to Geinitz's *Rhabdocarpus clavatus* occur along with *Trigonocarpus Parkinsoni* on the large slab from Peel Quarry. Geinitz's Rhabdocarpus (sp.) (*loc. cit.* pl. xxii. fig. 15*a–b*) is however certainly referable to *Trigonocarpus Parkinsoni*, Brongniart. *Trigonocarpus Parkinsoni* is frequent in all the Scotch and also in some of the English Coalfields.

Horizon.—Coal Measures.

Localities.—British. Ayrshire: Ardeer Sandstone Quarry, near Stevenston. Durham: Sunderland. Lancashire: Peel Quarry, near Bolton; Oldham. Northumberland: Newcastle-on-Tyne; Felling Colliery, near Newcastle-on-Tyne (=*Carpolithes alatus*, L. and H.). Worcestershire, near Bewdley.

PALÆOXYRIS, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 137, and Tableau des Genres de Végétaux Fossiles, p. 86, 1849.

Palæoxyris helicteroides, Morris, sp.

Carpolithes helicteroides.

Bronn, Index Palæont. p. 239.

Göppert and Berger, De Fruct. et Seminibus, p. 16.

Morris, Trans. Geol. Soc. 2nd ser. vol. v. Explan. to pl. xxxviii. fig. 12.

Palæoxyris Prendelii.
Lesquereux (*in part*), Report, Geol. Survey of Illinois, vol. iv. p. 464, pl. xxvii. fig. 10.

Spirangium Prendelii.
Lesquereux (*in part*), Coal Flora of Pennsyl. p. 519, pl. lxxv. fig. 15.
Schimper (*in part*), Traité d. Paléont. Végét. vol. iii. p. 585.

Remarks.—I have united with this species part of the specimens described by Lesquereux as *Palæoxyris Prendelii*, as they do not differ in any manner from *Palæoxyris helicteroides*, Morris, sp., except in being slightly larger. Lesquereux has evidently included two species under his *Palæoxyris Prendelii*.

Horizon.—Coal Measures.
Localities.—British. Shropshire : Coalbrook Dale.

CONIFERÆ.

ARAUCARIOXYLON, Kraus, 1870.

In Schimper's Traité de Paléontologie Végétale, vol. ii. p. 380.

Remarks.—The Collection contains a number of microscopical sections of stems which have been described by Witham and others as belonging to the *Coniferæ*. As a transverse, longitudinal, and radial section of each specimen are necessary for a satisfactory specific determination, and as it is now impossible to ascertain of those sections in the Collection which longitudinal, radial, and transverse slits have been cut from the same specimen, it would be unsafe to attempt to identify them. The greater part of them have been made from the fossil trees found at Craigleith and Granton Quarries, near Edinburgh, and at Tweed Mill and Lennel Braes, near Coldstream, and are from the original collection of the late Mr. Alexander Bryson. All of these localities are of Calciferous Sandstone age.

Some of these ancient conifers attained great dimensions. The trunk of that found at Craigleith Quarry in 1826 was 36 feet long and 3 feet in diameter at its base.* Another trunk found in the same quarry in 1830 was 47 feet long. This specimen was much compressed, but measured at its larger extremity 5 feet by 2 feet.† Both these trunks were mere fragments of the original trees, the upper and lower extremities of the stems being broken over.

The large tree (*Pinites Brandlingi*, L. and H.) discovered at Wideopen, near Gosforth, about five miles from Newcastle-on-Tyne, and which measured 72 feet in length, has been referred by several recent writers to the *Cycadaceæ* as the stem of *Cordaites*.‡

If then *Araucarioxylon* (*Pinites*) *Brandlingi* is unquestionably of *Cordaites* origin, as some authors state, how can any of the other stems which are at present included in the genus *Araucarioxylon* be distinguished from *Cordaites?* In other words, how are the Coniferous and Cycadaceous individuals of *Araucarioxylon* to be distinguished from each other? Or do all these so-called Coniferæ belong to the Cycadaceæ?

In the Calciferous Sandstone Series of Scotland the occurrence of *Cordaites* is extremely rare, and as far as I can remember I have only seen three examples of the leaves of these plants from that horizon, whereas coniferous-like stems are comparatively common, and carbonized fragments of a like wood are abundant in volcanic ash at many localities in Scotland.

* Witham, Internal Structure of Fossil Vegetables, p. 28, 1833.
† Witham, l.c. p. 29.
‡ Zittel and Schenk, Handbuch d. Palæontologie, ii. Band iii. lief. p. 243. Renault, Cours d. Botan. Foss. 1881, p. 82.

The curious fossils known as *Sternbergia* or *Artisia*, which occur throughout the whole of the carboniferous formation, have by some authors been referred to Coniferæ as the casts of their pith cavity. Similar *Sternbergia* pith casts have been described as occurring in stems of *Cordaites* by Grand 'Eury,* Renault, and Schenk, and finally Goldenberg has referred *Sternbergia* to *Lepidophloios* as the cast of its pith cavity.†

The microscopical sections in the Collection are from the following localities :—

Horizon.—Calciferous Sandstone Series.

Localities.—*British.* Berwickshire : Lennel Braes. Midlothian : Craigleith Quarry and Granton Quarry, near Edinburgh.

In addition to these are some blocks of fossil wood which are probably referable to this class.

Horizon.—Coal Measures.

Localities.—*British.* Warwickshire : Stanley, near Arley. Worcestershire : Dowles Brook, near Bewdley.

STERNBERGIA, Artis, 1825.

Antediluvian Phytology, p. 8.

Sternbergia approximata.
Brongniart, Prodrome, p. 137.
Dawson, Acadian Geol. 2nd ed. p. 491, 1868.
Lindley and Hutton, Foss. Flora, vol. iii. pls. ccxxiv., ccxxv.

Artisia approximata.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 247.
Unger, Synop. Plant. Foss. p. 171.

Sternbergia angulosa.
Brongniart, Prodrome, p. 137.

Sternbergia transversa.
Artis, Anted. Phytol. pl. viii.

Artisia transversa.
Roehl, Foss. Flora d. Steink. Form. Westph. p. 148, pl. iv. fig. 8.
Sternberg, Vers. ii. p. 192, pl. liii. figs. 7–9.

Dictyodendron Patricii.
Landsborough in Patrick, Annals and Mag. Nat. Hist. 1st ser. vol. xiii. p. 287, pl. v. fig. 1.

Sternbergia.
Williamson, Monthly Micros. Journ. vol. ii. p. 72, 1869.

Remarks.—The nature of the genus *Sternbergia*, Artis (*Artesia* Sternberg), has been mentioned in the remarks appended to *Araucarioxylon*.‡ Specific names have been applied to the various forms assumed by these fossils, which are only the casts of the pith cavity of plants which perhaps belong to distinct genera. A considerable number of specimens are in the Collection, but I have merely placed them under "*Sternbergia*," as the application of specific names to them does not seem to serve any practical purpose.

Some of the *Sternbergia* are shown to be enclosed within a stem.

Horizon.—Coal Measures.

Localities.—British. Ayrshire : Stevenston. Lanarkshire : Carluke. Durham : Gateshead. Shropshire : Oldbury. Worcestershire : Bewdley.

* Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 249, 1877.

† Goldenberg, Flora Saræp. Foss. heft 3, p. 27, 1862.

‡ See also Dawson, Acad. Geo. 2nd ed. p. 535, fig. 185, 1868, and Foss. Plants Dev. and Up. Sil. Formations, Canada p. 12, pl. i. figs. 1–4 and fig. 15, 1871.

DEVONIAN.

DEVONIAN.

ALGÆ.

CHONDRITES, Sternberg, 1838.

Versuch einer geognostisch-botanischen Darstellung der Flora der Vorwelt, vol. ii. p. 25.

Chondrites tenellus, Römer, sp.

Chondrites tenellus.
Göppert, Foss. Flora d. Sil. Devon. u. unter Kohl. p. 451.
„ Neues Jahrbuch, 1847, p. 682.

Fucoides tenellus.
Römer, Vers. des Harzgebirges, p. 1, pl. xii. fig. 1, 1843.
See also Schimper, Traité d. Paléont. Végét. vol. ii. p. 172.
Horizon.—Devonian.
Locality.—Foreign. Germany : Schulenburg.

BYTHOTREPHIS, Hall, 1847.

Palæontol. New York, vol. i. p. 8.

Bythotrephis mutabilis, Ettingshausen (m.s.).

Remarks.—The description of this species is not yet published, but Baron von Ettingshausen informs me that he hopes to issue it soon.
Horizon.—Devonian.
Locality.—Foreign. Plawutsch.

EQUISETACEÆ.

ASTEROCALAMITES, Schimper, 1862.

Terrain de Transition des Vosges, p. 321.

Asterocalamites scrobiculatus, Schlotheim, sp.

Calamites inornatus.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, p. 25, 1871.

Calamites transitionis.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, p. 25, pl. iv. figs. 41–46.
„ Acadian Geol. 2nd ed. p. 536, 1868.

Remarks.—For additional references and synonyms, see *ante*, p. 38.
Horizon.—Devonian.
Locality.—Foreign. Germany : Clausthal ; Herz.

CALAMOCLADUS, Schimper, 1869.
Traité d. Paléont. Végétale, vol. i. p. 323.

Calamocladus acicularis, Dawson, sp.

Asterophyllites acicularis.
Dawson, Acadian Geol. 2nd ed. p. 537, fig. 194*h*, 1868.
„ Quart. Journ. Geol. Soc. vol. xviii. p. 310, pl. xiii. fig. 16.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, p. 28, pl. v. figs. 54–57.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 458.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : Fern Ledges, Lancaster : St. John's (Presented by Sir J. W. Dawson).

ANNULARIA, Sternberg, 1820.
Versuch einer Geognost. Botanisch. Darstellung der Flora der Vorwelt. i. fasc. 2, p. 32.

Annularia latifolia, Dawson, sp.

Asterophyllites latifolia.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 311, pl. xiii. fig. 17.
„ Acadian Geol. 2nd ed. p. 538, fig. 187*a*, *b*, *d*, 1868.
„ Foss. Plants of Devon. and Upper Silur. Form. of Canada, pt. i. p. 28, pl. v. figs. 50–53, pt. ii. p. 115.

Annularia Dawsoni.
Schimper, Traité d. Paléont. Végét. vol. i. p. 350.

Horizon. —Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

PINNULARIA, Lindley and Hutton, 1834.
Fossil Flora of Great Britain, vol. ii. p. 81.

Pinnularia dispalans, Dawson.

Pinnularia dispalans.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 312, pl. xiii. fig. 22.
„ Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 33, pl. vii. figs. 74–76.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W Dawson).

FILICACEÆ.

SPHENOPTERIDEÆ.

SPHENOPTERIS, Brongniart, 1822.
Sur la Classification des Végétaux Fossiles, p. 33.

Sphenopteris Schimperiana, Göppert, sp.

Sphenopteris Schimperiana.
Schimper, Végét. Foss. d. Terr. d. Trans. des Vosges, p. 341, pl. xxvii.
„ Traité d. Paléont. Végét. vol. i. p. 408.

Sphenopteris Schimperi.
Heer, Foss. Flora d. Bären Insel, p. 38.

Hymenophyllites Schimperi.
Göppert, Foss. Flora d. Sil. Devon. u. Unter Kohlf. p. 490, pl. xxxvii. fig. 2.

Hymenophyllites Schimperianus.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 513, pl. xv. fig. 13.

? Calymmotheca Schimperi.
Stur, Culm Flora, heft ii. p. 255, pl. xvii. fig. 1.
„ Morph. u. Syst. d. Culm u. Carbonfarne, p. 174.

Sphenopteris densepinnata.
Ludwig, Palaeontographica, vol. xvii. p. 117, pl. xxiii. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 463.

Sphenopteris pachyrrachis.
Ludwig (non Göppert), Palaeontographica, vol. xvii. p. 119, pl. xxiii. fig. 2.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 463.

Horizon.—Devonian. (Transition Rocks.)
Locality.—Foreign. Vosges : Niederburbach.

Sphenopteris marginata, Dawson.

Sphenopteris marginata.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 321, pl. xv. fig. 38.
„ Acadian Geol. 2nd ed. 1868, p. 551.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, p. 52, pl. xvi. fig. 184.
Schimper, Traité d. Paléont. Végét. vol. i. p. 408, vol. iii. p. 461.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

Sphenopteris pilosa, Dawson.

Sphenopteris pilosa.
Dawson, Acadian Geol. 2nd ed. 1868, p. 552, fig. 192*f*.

Callipteris pilosa.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 51, pl. xvi. fig. 189.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

Sphenopteris Harttii, Dawson.

Sphenopteris Harttii.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 321, pl. xvii. fig. 32.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 52, pl. xvi. figs. 176, 177.
„ Acadian Geol. 2nd ed. 1868, p. 551, fig. 192*e*.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

Sphenopteris curtiloba, Dawson, sp.

Hymenophyllites curtilobus.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 321, pl. xv. fig. 39.

Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 53, pl. xvi. figs. 178, 179.
,, Acadian Geol. 2nd ed. p. 552, fig. 129*g*, 1868.

Horizon.—Middle Devonian.
Locality—*Foreign.* New Brunswick: St. John's (Presented by Sir J. W. Dawson).

Palæopterideæ.

PALÆOPTERIS, Schimper, 1869.

Traité de Paléontologie Végétale, vol. i. p. 475.

Palæopteris Hibernica, Forbes, sp.

Palæopteris Hibernica.
Carruthers, Geol. Mag. vol. ix. pl. ii. figs. 1–4, 1872.
Schimper, Traité d. Paléont. Végét. vol. i. p. 475, pl. xxxvi.

Cyclopteris Hibernica.
Baily, Brit. Assoc. Report for 1858, p. 75; *id.* for 1859, p. 99.
Forbes, Brit. Assoc. Report for 1852, p. 43.
Göppert, Foss. Flora d. Sil. Devon. u. Unter Kohl. p. 499, pl. xxxviii. fig. 1*a*, *b*.

Cyclopteris McCoyana.
Göppert, Foss. Flora d. Sil. Devon. u. Unter Kohl. p. 500, pl. xxxviii. fig. 2*a*, *b*.

Adiantites Hibernicus.
Baily, Geol. Survey Ireland, Explan. sheets 192 and 199, pp. 16 and 19, sheets 187, 195, and 196, pp. 14, 22, and 23, sheets 147 and 157, pp. 13 and 14, fig. 1.

? Archæopteris Gaspiensis.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. ii. p. 99, pl. xxi. and xxiii. fig. 14, 1882.

Remarks.—I am inclined to think that *Archæopteris Gaspiensis*, Dawson, should be united with *Palæopteris Hibernica*. Until better preserved specimens of the former plant be discovered, showing more clearly what are the real differences between these two species, the true specific value of *Archæopteris Gaspiensis* must, I am afraid, remain uncertain.
Horizon.—Upper Devonian.
Locality.—*British.* Ireland: Kiltorkan, Waterford.

Palæopteris Rogersi, Dawson, sp.

Cyclopteris (*Archæopteris*) *Rogersi.*
Dawson, Quart. Journ. Geol. Soc. vol. xix. p. 463, pl. xvii. figs. 17, 18, pl. xix. fig. 27.
,, Foss. Plants, Devon. and Upper Silur. Form. of Canada, p. 46, pl. xv. fig. 171, 1871.

Horizon.—Devonian.
Locality.—*Foreign.* United States: Perry, Maine (Presented by Sir J. W. Dawson).

Palæopteris Gaspiensis, Dawson, sp.

Archæopteris Gaspiensis.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. ii. p. 99, pls. xxi. and xxiii. fig. 14.

Horizon.—Upper Devonian.
Locality.—*Foreign.* Canada: Dalhousie, Province of Quebec (Presented by Sir J. W. Dawson).

Palæopteris Jacksoni, Dawson.

Palæopteris Jacksoni.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 484.

Cyclopteris (*Archæopteris*) *Jacksoni.*
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 319, vol. xix. p. 462, pl. xix. fig. 26.
„ Acadian Geol. 2nd ed. p. 547, fig. 191, 1868.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 45, pl. xv. figs. 167–169.

Horizon.—Upper Devonian.
Locality.—Foreign. Canada : Dalhousie, Province of Quebec (Presented by Sir J. W. Dawson).

Palæopteris (?) Brownii, Dawson, sp.

Cyclopteris (*Platyphyllum*) *Brownii.*
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada. pt. i. p. 46, pl. xv. fig. 172, pt. ii. p. 101, pl. xxiii. figs. 11–13.
„ Quart. Journ. Geol. Soc. vol. xix. p. 463, pl. xvii. fig. 6.

Horizon.—Devonian.
Locality.—Foreign. United States : Perry, Maine (Presented by Sir J. W. Dawson).

Palæopteris obtusa, Lesquereux, sp.

Archæopteris obtusa.
Lesquereux, Coal Flora of Pennsyl. vol. i. p. 301, pl. xlix. figs. 6, 7, vol. iii. p. 774.

Noeggerathia obtusa.
Lesquereux, Geol. of Pennsyl. vol. ii. p. 854, pl. i. fig. 11.

Cyclopteris obtusa.
Dawson, Foss. Plants of Devon. and Upper Silur. Form. of Canada, pt. ii. p. 100, pl. xxii.

Horizon.—Upper Devonian.
Locality.—Foreign. Canada : Dalhousie, Province of Quebec (Presented by Sir J. W. Dawson).

ANEIMITES, Dawson, 1861.*

Quart. Journ. Geol. Soc. vol. xvii. p. 5.

Aneimites obtusa, Dawson.

Aneimites obtusa.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. ii. p. 101.
Schimper, Traité d. Paléont. Végét., Atlas, pl. cvii. fig. 11.

Cyclopteris (*Aneimites*) *obtusa.*
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 319, pl. xv. fig. 33.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 46, pl. xvi. fig. 188.
„ Acadian Geol. 2nd ed. p. 547, fig. 192*a*, 1868.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

* Schimper, 1874, Traité d. Paléontologie Végétale, vol. iii. p. 489.

Neuropterideæ.

NEUROPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.

Neuropteris polymorpha, Dawson.

Neuropteris polymorpha.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 320, pl. xv. fig. 36.
„ Foss. Plants, Devon. Upper Silur. Form. of Canada, p. 49, pl. xviii. fig. 212.
„ Acadian Geol. 2nd ed. p. 549, fig. 192*c*, 1868.
Schimper, Traité d. Paléont. Végét. vol. i. p. 443.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : near Carlton, St. John's (Presented by Sir. J. W. Dawson).

Alethopterideæ.

ALETHOPTERIS, Sternberg, 1820.

Versuch einer Geognostisch-Botanischen Darstellung d. Flora der Vorwelt, vol. i. fasc. iv. p. xxi.

Alethopteris discrepans, Dawson.

Alethopteris discrepans.
Dawson, Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 54, pl. xviii. figs. 203–205.
„ Acadian Geol. 2nd ed. 1868, p. 552, fig. 192*i*.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 502.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

PECOPTERIS, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 33.

Pecopteris densifolia, Dawson.

Pecopteris densifolia.
Dawson, Foss. Plants, Devon. and Upper Sil. Form. of Canada, pt. i. p. 56, pl. xvii. figs. 195, 196.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

Pecopteris serrulata, Hartt.

Pecopteris serrulata.
Dawson, Acadian Geol. 2nd ed. 1868, p. 553, fig. 192*k*.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 55, pl. xviii. figs. 207–209, pt. ii. p. 117.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 495.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

MEGALOPTERIS, Dawson, 1871.

Fossil Plants of the Devonian and Upper Silurian Formations of Canada, part i. p. 51.

Megalopteris Dawsoni, Hartt, sp.

Neuropteris (Megalopteris) Dawsoni.
Dawson, Foss. Plants, Devon. and Upper Silur. Form. of Canada, pt. i. p. 51, pl. xvii. figs. 191–194.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 476.

Neuropteris Dawsoni.
Dawson, Acadian Geol. 2nd ed. 1868, p. 551, fig. 193.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick: Fern Ledges, Lancaster (Presented by Sir J. W. Dawson).

Lycopodiaceæ.

LYCOPODITES, Goldenberg, 1855.

Flora Saræpontana Fossiles, heft 1, p. 9.

Lycopodites (?) Richardsoni, Dawson.

Lycopodites Richardsoni.
Dawson, Quart. Journ. Geol. Soc. vol. xix. p. 461, pl. xvii. figs. 1, 2, vol. xviii. p. 314.
„ Fossil Plants, Devon. and Upper Silurian Form. of Canada, p. 34, pl. vii. fig. 81.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 11.

Horizon.—Devonian.
Locality.—Foreign. United States: Perry, Maine (Presented by Sir J. W. Dawson).

LEPIDODENDRON, Sternberg, 1820.

Versuch einer Geognostisch-Botanischen Darstellung der Flora der Vorwelt, i. fasc. 1, p. 25, and fasc. 4, p. x.

Lepidodendron Australe, McCoy.

Lepidodendron Australe.
Etheridge, Cat. Australian Foss. p. 31.
McCoy, Prodrome Pal. Victoria, Decade i. 1874, p. 37, pl. ix.

Lepidodendron nothum.
Carruthers, Quart. Journ. Geol. Soc. Aug. 1872, vol. xxviii. pl. xxvi.
Etheridge, Cat. Australian Foss. p. 31.

Remarks.—It is a little doubtful if this fossil is really referable to the genus *Lepidodendron*. The plant figured and described as *Lepidodendron nothum* by Mr. Carruthers (which, however, is not Unger's species of that name) appears to be indistinguishable from *Lepidodendron Australe*, McCoy.

Horizon.—(?) Devonian.
Locality.—Foreign. North Queensland: Sandy Creek, Star River.

LEPTOPHLEUM, Dawson, 1862.

Quart. Journ. Geol. Soc. vol. xviii. p. 316.

Leptophleum rhombicum, Dawson.

Leptophleum rhombicum.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 316, pl. xii. fig. 8, pl. xvii. fig. 53.
„ Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 36, pl. viii. figs. 88, 89.
Etheridge, Cat. Australian Foss. p. 31.

Remarks.—The species is represented in the Collection by a plaster cast.
Horizon.—Devonian.
Locality.—Foreign. United States: Perry, Maine (Presented by Sir J. W. Dawson).

PSILOPHYTON, Dawson, 1859.

Quart. Journ. Geol. Soc. vol. xv. p. 478.

Psilophyton princeps, Dawson.

Psilophyton princeps.
Dawson, Quart. Journ. Geol. Soc. vol. xv. p. 479, fig. 1, vol. xviii. p. 315, vol. xix. p. 465, pl. xviii. fig. 22.
„ Acadian Geol. 2nd ed. 1868, p. 543.
„ Geol. Survey of Canada, Reports of Progress, 1863, p. 397, fig. 426, and p. 398, fig. 427.
„ Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 37, pls. ix., x. figs. 111-119, pl. xi. figs. 127-129, and 133 and 134, and pt. ii. p. 103.
Renault, Cours d. Botan. Foss. 1882, p. 7, pl. xvi. figs. 9, 10.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 76, vol. iii. p. 548.

Horizon.—Lower Devonian.
Locality.—Foreign. Province of Quebec: Gaspé. New Brunswick: Campbellton (Presented by Sir J. W. Dawson).

Psilophyton Dechenianus, Göppert, sp.

Psilophyton Dechenianum.
Carruthers, Journ. Botany, 1873, vol. ii. p. 326, pl. 137, figs. 1 (? 2), 3, and 4.

Haliserites Dechenianus.
Göppert, Neues Jahrbuch, 1847, p. 686.
„ Foss. Flora d. Ubergangs, p. 88, pl. ii. 1852.
„ Flora d. Sil. Devon. u. Unter Kohl. p. 442, 1859.
„ Karsten and Dechen's Archiv. für Min. vol. xxiii. 1850, p. 42.
Sandberger, Vers. d. Rheinischen Schichtensyst, p. 424, pl. xxxviii. fig. 1.

Psilophyton robustius.
Dawson, Quart. Journ. Geol. Soc. vol. xv. p. 481, figs. 2*a*, *b*, 1859.
„ Foss. Plants, Devon. and Upper Silur. Form. of Canada, p. 39, pl. x. fig. 121, pl. xi. figs. 130-132, pl. xii. 1871.
Renault, Cours d. Botan. Foss. 1882, p. 7, pl. xvi. figs. 11, 12.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 76, and vol. iii. p. 548.

Lycopodites Milleri.
Salter, Quart. Journ. Geol. Soc. vol. xiv. p. 75, pl. v. figs. 8*a*, *b*, 1858, vol. xv. p. 407, fig. 3, 1859.

Lepidodendron nothum.
Salter (non Unger), Quart. Journ. Geol. Soc. vol. xiv. p. 74, pl. v. figs. 9*a*, *b*, *c*, vol. xv. p. 407, fig. 4.

Lepidodendron Gaspianum.
Crépin, Bull. Soc. Roy. Bot de Belgique, vol. xiv. p. 218, pls. iii., iv., and v.

Lepidodendron Burnotense.
Gilkinet, Bull. Acad. Roy. de Belgique, 2e sér. vol. xl. p. 141, figs. 2, 4, and 5 (fig. 5 in part), 1875.

Hostinella hostinensis.
Stur, Sitzb. der k. Akad. der. Wissensch. vol. lxxxiv. 1 Abth. heft 1 and 2, 1881, p. 352, pl. iii. figs. 1 and 2, pl. iv. figs. 1–8.

Lycopodite?
Miller, Testimony of the Rocks, p. 24, fig. 12, 1857.

"*Terrestrial plant allied to Lepidodendron.*"
Miller, Testimony of the Rocks, p. 432, fig. 120, 1857.

Fucoids.
Miller, Testimony of the Rocks, p. 429, fig. 119, 1857 (left hand figure.)

Vegetable impressions.
Miller, Old Red Sandstone, p. 117, pl. vii. figs. 3–8, 1865.
,, Footprints of the Creator, pp. 194, 196, figs. 61 and 62*a*, *b*, 1853.

"*Plant.*"
Vanuxem, Nat. Hist. of New York, Geol. pt. iii. p. 161, fig. 40, 1842.

Rootlets.
Salter, Quart. Journ. Geol. Soc. vol. xiv. p. 74, pl. v. figs. 3–6 (? not fig. 7).

Young shoot of a Coniferous? plant.
Salter, Quart. Journ. Geol. Soc. vol. xv. p. 408, fig. 14*b*.

Remarks.—From many associations this is one of the most interesting of Palæozoic plants with which the Botanist has to deal. The earliest figure of *Psilophyton Dechenianus* with which I am acquainted is that given by Vanuxem, which is merely referred to by him as a "Plant." In 1847 the name of *Haliserites Dechenianus* was given by Göppert to some fossils from the "Transition Rocks," which, however, were not figured by him till the appearance of his Fossile Flora der Ubergangsgebirges in 1852, where on plate ii. several specimens are illustrated. These are very fragmentary examples, but all the characters they show agree in every particular with the fossil which was described by Sir J. W. Dawson as *Psilophyton robustius* (Quart. Journ. Geol. Soc. vol. xv. p. 481, 1859), but more fully in 1871 (Fossil Plants, Devon. and Upper Sil. Form. of Canada, p. 39, pl. x. fig. 121, pl. xi. figs. 130–132, and pl. xii.). That *Psilophyton robustius*, Dawson, is founded on more perfect specimens of *Haliserites Dechenianus* seems to me certain. Sir J. W. Dawson himself points out that there can be little doubt that the species *Haliserites Dechenianus*, Göppert, is founded on badly presented specimens of *Psilophyton*.

I am, however, of opinion that they are the same species, and therefore unite them, for though Dawson's examples are in a much better state of preservation than the fossils figured as *Haliserites Dechenianus* by Göppert, they possess all the characters of this last-mentioned plant, with the *addition of other characters* consequent on their more perfect state of preservation. Sir J. W. Dawson has been successful in finding specimens of his *Psilophyton robustius* with the internal structure preserved. He says the stem is composed of a thick vascular axis of scalariform vessels, surrounded by parenchymatous cells: those towards the periphery of the stem are elongated, and much firmer in texture.

Mr. Carruthers, in his paper "On some Lycopodiaceous Plants from the Old Red Sandstone of the North of Scotland,"* has clearly demonstrated that the plants figured by Hugh Miller in his Old Red Sandstone, Testimony

* Journ. Botany, 1873, vol. ii. p. 321.

of the Rocks, and the Asterolepis of Stromness, as *Fucoids* and *Vegetable impressions*, and which were subsequently named *Lycopodites Milleri*, *Lepidodendron nothum?* Unger, and "*Rootlets*," by Mr. Salter, are all to be referred to *Psilophyton Dechenianus*, Göppert, sp.

About two years ago, Dr. A. Geikie, Director-General of the Geological Survey of Great Britain, submitted to me for examination some specimens of *Psilophyton* from Perthshire. These examples, which showed the fructification, further confirmed my opinion that *Psilophyton robustius*, Dawson, was nothing else than the plants identified by Mr. Carruthers as *Psilophyton* (*Haliserites*) *Dechenianus*, Göppert, sp.

It has been thought by some that *Lepidodendron Gaspianum*, Dawson, might be referable to *Psilophyton Dechenianus*, but if Sir J. W. Dawson is correct in interpreting his specimen (Foss. Plants, Devon. and Upper Sil. Form. of Canada, pl. viii. fig. 84) as the fruit of his *Lepidodendron Gaspianum*, this plant cannot be the same as his *Psilophyton robustius*. But whatever may be the nature of Dawson's *Lepidodendron Gaspianum*, it is evident that pls. iii., iv., and v. of *Lepidodendron Gaspianum*, Crépin* (? not Dawson), are the *Psilophyton Dechenianus*, Göppert, sp. As to those specimens which he figures on pls. i. and ii. I cannot express an opinion, as I have not seen any similar *Lepidodendron*-like fossils (especially like that figured on his pl. i. fig. 1) occurring with the Scotch plants, though to his fig. 2, pl. i., specimens bearing some resemblance have been collected in Scotland.† It is, however, quite possible that Crépin is correct in placing all his plants under one name.

The entire agreement of Crépin's pls. iii., iv., and v. with the figures given by Hugh Miller and Mr. Carruthers, proves conclusively that all these specimens belong to one species—the *Psilophyton Dechenianus*, Göppert, sp., as interpreted by Mr. Carruthers.

There is also little room for doubt that the plants figured by Gilkinet as *Lepidodendron Burnotense* are identical with *Psilophyton Dechenianus*, Göppert, sp., and consequently with *Lepidodendron Gaspianum* (pls. iii.–v.) of Crépin. Gilkinet's figures might have been drawn from Scotch examples, they so thoroughly agree with them. It must, however, be noted that the larger fossil which occupies the centre of his fig. 5 does not appear to be the same as those fossils figured by Crépin under the name of *Lepidodendron Gaspianum* (pl. i. figs. 1 and 3, and pl. ii.); in fact, is perhaps not vegetable, but more probably a fragment of a large *Pterygotus*, similar to those which are associated with *Psilophyton* in the Old Red Sandstone of Scotland.‡ The small branches across which this *Pterygotus*-like fossil lies are however to be referred to *Psilophyton Dechenianus*.

Stur, in his "Silur.-Flora der Etage H-h, in Böhmen," under the name of *Hostinella hostinensis*, figures what is unquestionably only the *Psilophyton Dechenianus* (Carruthers), Göppert, sp. He unites with it *Fucoides hostinensis*, Barr., *Haliserites zonarioides*, Krejči, and *Protopteridium hostinense*, Krejči.§ The figures given by Stur (pl. iv. 1–6) are similar in all respects to the Scotch plants, and Stur's description further confirms their identity. His figures (pl. iv. figs. 7, 8) show a much less common condition of the same species, but the Museum of Science and Art, Edinburgh, possesses a like example. These plants are regarded by Stur as Algæ, and placed in the order *Gigartineæ;* but that they occupy a much higher position in the botanical scale has been shown by Dawson, who, as already mentioned, has been enabled to describe the structure of these plants, which is undoubtedly Lycopodiaceous.

* Crépin, Bull. Soc. Roy. Bot. de Belgique, vol. xiv.

† See Salter, Quart. Journ. Geol. Soc. vol. xv. p. 408, fig. 14*b*.

‡ B. N. Peach, Proceed. Roy. Phys. Soc. vol. vii. p. 343, 1883.

§ Krejči, Sitzungsberichte d. k. k. Böhm. Gesell. d. Wissensch. in Prag, Jahrgang 1879, p. 201 1880; *ibid.*, Jahrgang 1881, p. 68, 1882.

The view that *Psilophyton* does not exist as a true genus, but that its larger branches belong to a *Lepidodendron*, and its supposed fruiting branches to a fern, I cannot admit.*

The genus *Psilophyton* contains a very distinct group of Lycopods, whose fruit clearly prohibits it from being united with any other genus of plants.

The fossil named *Psilophyton condrusorum* by Crépin,† does not, I believe, belong to Dawson's genus *Psilophyton*, and this view has already been adapted by Crépin himself, who has constituted the genus *Rhacophyton* for his *Psilophyton condrusorum*.

Feistmantel figures two specimens in his "Das Kohlenkalkvorkommen bei Rothwaltersdorf in der Grafschaft Glatz,"‡ which he refers to *Psilophyton robustius*. His two fossils do not appear to belong to the genus *Psilophyton*, nor even to the *Lycopodiaceæ*, but most probably to Stur's *Calymmatotheca*.

I have examined the specimen described as *Caulopteris ? Peachii*, by Salter (Quart. Journ. Geol. Soc. vol. xv. p. 408, fig. 14*a*). It does not seem to belong to the *Filicaceæ*, but is, I am much more inclined to think, a large stem of *Psilophyton Dechenianus*.

Among the specimens in the Collection, and also in the Museum of Science and Art, Edinburgh, are examples which show intermediate stages between this specimen and others of undoubted *Psilophyton Dechenianus*. *Caulopteris ? Peachii* cannot at all events be the trunk of *Palæopteris Hibernica* as suggested by Schimper,§ for that fern does not, to my knowledge, occur in any of the localities from which *Psilophyton Dechenianus* has yet been collected.

As I am not, however, in a position to affirm positively what is the true nature of *Caulopteris ? Peachii*, a number of large stems, which in some respects resemble it, though most probably belonging to *Psilophyton Dechenianus*, are placed in this Catalogue under the head of "stems."

Horizon.—Lower Devonian (Old Red Sandstone).

Localities.—British. Banffshire : Gamrie. Caithness : Ackergill Castle, near Wick ; Alrig Quarry ; Devil's Punch Bowl, Island of Stroma ; East Mey, Barrogill Castle ; Howland, near Wick ; John O'Groats ; Kilmster, near Wick ; St. John's Point, near Mey Castle ; Stone Gun Quarry, near Thurso ; Southhead, near Wick. Forfarshire : Turin Quarry. Orkney : Dale Quarry, Stromness. Shetland : near Lerwick.

Foreign. New Brunswick : Campbellton, *P. robustius*, Dawson (Presented by Sir J. W. Dawson).

ARTHROSTIGMA, Dawson, 1871.

Foss. Plants, Devon. and Upper Sil. Form. of Canada, pt. i. p. 41.

Arthrostigma gracile, Dawson.

Arthrostigma gracile.

Dawson, Foss. Plants, Devon. and Upper Sil. Form. of Canada, pt. i. p. 41, pl. xiii., pt. ii. p. 104, pl. xxiv. fig. 22.

Schimper, Traité d. Paléont. Végét. vol. iii. p. 549.

Horizon.—Middle Devonian.

Locality.—Foreign. New Brunswick : St. John's (Presented by Sir J. W. Dawson).

* See Crépin, *loc. cit.* p. 13.

† Bull. l'Acad. R. Belgique, 2e sér. vol. xxxviii. Aug., 1874.

‡ Zeitsch. d. deut. Geol. Gesell. vol. xv. p. 541, pl. 18, figs. 39, 40.

§ Traité d. Paléont. Végét. vol. iii. p. 527.

CYCLOSTIGMA, Haughton, 1860.

Annals and Mag. Nat. Hist., 3rd series, vol. v. p. 443.

Cyclostigma Kiltorkense, Haughton.

Cyclostigma Kiltorkense.
Baily, Geol. Survey, Ireland, Expl. sheets 192–199, pp. 16, 19, and 20.
Haughton, Nat. Hist. Review, vol. vi. pl. xl. fig. 1, vol. vii. p. 222.
„ Annals and Mag. Nat. Hist. 3rd ser. vol. v. p. 444.
Heer, Foss. Flora d. Bären. Insel. p. 43, pl. xi.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 540.

Cyclostigma minuta.
Baily, Geol. Survey, Ireland, Expl. sheets 187, 195, and 196, p. 21.
Haughton, Nat. Hist. Review, vol. vi. pl. xl. fig. 2, vol. vii. p. 222.
„ Annals and Mag. Nat. Hist. 3rd ser. vol. v. p. 444.
Heer, Foss. Flora d. Bären Insel, p. 44, pl. vii. figs. 11, 12, pl. viii. fig. 5*b*, pl. ix. fig. 5*a*.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 540.

Cyclostigma Griffithii.
Haughton, Nat. Hist. Review, vol. vi. pl. xli., vol. vii. p. 222.
„ Annals and Mag. Nat. Hist. vol. v. 3rd ser. p. 445.

Cyclostigma, sp.
Haughton, Nat. Hist. Review, vol. vi. pls. xxxviii. and xxxix.

Lepidodendron Griffithsii.
Baily, Brit. Assoc. Report for 1859, p. 99.
„ Quart. Journ. Geol. Soc. vol. xxvii. p. 2, 1871.

Lepidodendron minutum.
Baily, Quart. Journ. Geol. Soc. vol. xxvii. p. 2, 1871.

Sagenaria Veltheimiana.
Baily, Geol. Survey, Ireland, Expl. sheets 192–199, pp. 16, 19, and 20, fig. 1*a*, and Expl. sheets 187, 195, and 196, pp. 14, 21, and 22, fig. 3.

Knorria Bailyana.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 48.

Remarks.—The leaf-scars are oval or almost circular, and in well-preserved specimens they show slightly above their centre, three little vascular impressions. The bark between the leaf-scars is ornamented with delicate longitudinal lines. The older stems become irregularly furrowed, and when badly preserved might be mistaken for *Calamites*. The collection contains a specimen so furrowed, but which still shows very beautifully the characteristic *Cyclostigma* leaf-scar. On older stems the scars became more distant. The leaves are long, linear, single-nerved, and end in a setaceous point. After examining well-preserved specimens of *Cyclostigma* and *Rhytidodendron*, Boulay, I fail to discover any real character by which the two genera can be kept separate.

There are in the Collection three small specimens from Lower Albany, South Africa, which are closely related to *Cyclostigma Kiltorkense*. The exact horizon of these examples is not known.

Horizon.—Devonian.

Locality.—British. Ireland : Kiltorkan, county Kilkenny.

STIGMARIA, Brongniart, 1822.

Sur la Classification des Végétaux Fossiles, p. 9.

Stigmaria ficoides, Brongniart.

Remarks.—For notes and references, see *ante*, p. 201.

Horizon.—Devonian.

Locality.—Foreign. Vosges : Niederburbach.

CYCADACEÆ.

CORDAITES, Unger, 1850.

Genera et Species Plantarum Fossilium, p. 277.

Cordaites Robbii, Dawson.

Cordaites Robbii.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 316, pl. xiv. figs. 31*a*, *b*, *c*.
„ Acadian Geol. 2nd ed. p. 544, fig. 190, 1868.
„ Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 43, pl. xiv. figs. 156–162.

Pycnophyllum Robbii.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 562.

Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick: St. John's (Presented by Sir J. W. Dawson).

Cordaites angustifolia, Dawson.

Cordaites angustifolia.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 318.
„ Foss. Plants, Devon. and Upper Sil. Form. of Canada, pt. i. p. 44, pl. xiv. fig. 163, pt. ii. p. 106.
Horizon.—Upper Devonian.
Locality.—Foreign. New Brunswick: Campbellton (Presented by Sir J. W. Dawson).

CARDIOCARPUS, Brongniart, 1828.

Prodrome d'une Histoire des Végétaux Fossiles, p. 87.

Cardiocarpus cornutus, Dawson.

Cardiocarpus cornutus.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 324, pl. xiii. figs. 23, 24.
„ Acadian Geol. 2nd ed. p. 554, fig. 194*a*, 1868.
„ Foss. Plants, Devon. and Upper Sil. Form of Canada, p. 60, pl. xix. fig. 214–218.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 567.
Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick: St. John's (Presented by Sir J. W. Dawson).

CONIFERÆ.

ARAUCARIOXYLON, Kraus, 1870.

In Schimper's Traité de Paléontologie Végétale, vol. ii. p. 380.

Araucarioxylon Ouangondianum, Dawson, sp.

Dadoxylon Ouangondianum.
Dawson, Quart. Journ. Geol. Soc. vol. xviii. p. 306.
„ Acadian Geol. 2nd ed. p. 535, fig. 185.
„ Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 12, pl. i. figs. 1–4 and fig. 15.
Schimper, Traité d. Paléont. Végét. vol. iii. p. 622 (foot note).
Horizon.—Middle Devonian.
Locality.—Foreign. New Brunswick: St. John's (Presented by Sir J. W. Dawson).

INCERTÆ SEDIS.

PROTOTAXITES, Dawson, 1859.

Quart. Journ. Geol. Soc. vol. xv. p. 484.

Prototaxites Logani, Dawson.

Prototaxites Logani.

Dawson, Quart. Journ. Geol. Soc. vol. xv. p. 484.

" Foss. Plants, Devon. and Upper Sil. Form. of Canada, pt. i. p. 16, pl. ii. figs. 18–27, pt. ii. p. 107.

Nematophycus Logani.

Carruthers, Monthly Micro. Journ., 1872, vol. viii. p. 160, pls. xxxi., xxxii.

Horizon.—Upper Devonian.

Locality.—Foreign. Canada : Dalhousie, Province of Quebec (Presented by Sir J. W. Dawson).

Stems.

Remarks.—Under this heading are placed the stems referred to in the notes appended to *Psilophyton Dechenianus.** They may belong to more than one species, but they do not show any characters by which they can be separated from each other. Some similar examples have been figured and described by Mr. Salter as "Coniferous Wood" † and "Flattened Roots."‡ On several of the specimens the vegetable matter is converted into bright coal. They occurred in company with *Psilophyton Dechenianus.*

Horizon.—Old Red Sandstone.

Localities.—British. Caithness : Ackergill Castle, near Wick ; Borgie Quarry, Olrig ; near Barrogill, Castle ; Castlehill ; Gallowshill, near Thurso ; John O'Groats ; Stone Gun Quarry, near Thurso. Dunscansbay ; Wydale, near Thurso. Forfarshire : Turin Quarry.

Stem.

Remarks.—This example may perhaps belong to Unger's *Stereocalameæ.*§ Salter describes similar stems to that included here as having their surface pretty regularly fluted by delicate longitudinal ridges, the intervening hollows being gently concave, not abruptly grooved ; these ridges are tolerably regular and equidistant, without being absolutely continuous ; seldom as much as a line apart, but occasionally more. They are not interrupted by any transverse joints as in *Calamites.*‖

Horizon.—Old Red Sandstone.

Locality.—British. Shetland : Lerwick.

SPOROCHNUS, Stur (? non Kützing), 1881.

Sitzb. k. Akad. Wissensch. vol. lxxxiv. abth. i. p. 342.

? Sporochnus, sp.

See Stur, Die Silur.-Flora der Etage H-h., in Böhmen, *loc. cit.* 1881, p. 330.

Remarks.—The fossil placed here has considerable similarity with *Sporochnus Krejčii*, Stur. The specimen has very much the appearance of a root

* See *ante*, p. 235.

† Quart. Journ. Geo. Soc. vol. xiv. p. 72, pl. v. fig. 2, and vol. xv. p. 407, fig. 6.

‡ *Ibid.* vol. xv. p. 407, fig. 5.

§ Richter and Unger, Beitrag zur Palæontologie des Thüringer Waldes. p. 181, pl. xiii. figs. 3–11.

‖ Quart. Journ. Geol. Soc. vol. xiv. p. 73, pl. v. fig. 1.

with its attached rootlets. It was found associated with *Psilophyton Dechenianus*.

Stur has described what he believes to be the fruit of *Sporochnus Krejčii*, which consists of little club-shaped receptacles placed at the extremities of the hair-like filaments of the Alga. No similar structures are seen on the British example, which is not well preserved. Only one specimen of this curious fossil is in the Collection, but the counterpart, as well as the fossil proper, is fortunately preserved.

Horizon.—Old Red Sandstone.

Locality.—British. Caithness : John O'Groats.

Rhacophyllum-Like Fossil.

Remarks.—The example in the Collection is the only specimen of this curious *Rhacophyllum*-like fossil with which I am acquainted. It measures $10\frac{1}{2}$ inches in length, and is of almost equal width, about $1\frac{1}{4}$ inches, till near its apex. The rachis (?) at its base is about $\frac{1}{8}$ inch wide, and gives off alternate pinnæ (?), which are directed upwards, or even adpressed to the rachis. Six pairs of pinnæ occupy about 6 inches, the lower ones being slightly more distant from each other than the upper pinnæ. Towards the apex the pinnæ are closer and not so clearly defined, which arises from some of the upper pinnæ being apparently drawn together, probably by mechanical agencies. The longest pinna measures $2\frac{3}{4}$ inches, the central axis being fully $\frac{1}{10}$ inch in width, from which spring lateral segments. Those on this pinna are not well shown, and appear to be imperfect. On some of the upper pinnæ the lateral segments divide into two arms in a dichotomous manner. The whole specimen seems to have suffered from decay, through prolonged immersion. The plant which appears most closely related to this species is *Sphenopteris Guilelmi imperatoris*, Weiss. (Beitr. zur Culm-Flora von Thüringen, p. 95, pl. xiv. 1883.) From this species it is distinguished by the pinnæ being shorter, less segmented, and the segments broader and without any trace of a central vein.

Horizon.—Old Red Sandstone.

Locality.—British. Caithness : John O'Groats.

SILURIAN.

SILURIAN.

ALGÆ.

BYTHOTREPHIS, Hall, 1847.

Palæontol. New York, vol. i. p. 8.

Bythotrephis gracilis, Hall.

Bythotrephis gracilis.
Etheridge, Quart. Journ. Geol. Soc. vol. xxxiv. p. 574.
Geol. Survey of Canada, Report of Progress, 1863, p. 937.
Hall, Palæontol. New York, vol. i. p. 62, pl. xxi. fig. 1.
Schimper, Traité d. Paléont. Végét. vol. i. p. 198.

Fucoides gracilis.
Hall, Nat. Hist. New York, Geol. part. iv. p. 69. fig. 14, 1843.

Remarks.—Göppert unites *Bythotrephis gracilis* with *Chondrites antiquus*, Sternberg (Flora d. Sil. Devon. u. Unter Kohl. p. 434).
Horizon.—Silurian.
Localities.—Foreign. Arctic America: Gould Bay. United States: Cincinnati, Ohio (Lower Silurian, Cincinnati Group, Caradoc). Western Ontario (Lower Silurian, Trenton Group). Hamilton, Ontario (Upper Silurian, Clinton Group).

Bythotrephis divaricata, Kidston, n.s.

Remarks.—This is related to *Bythotrephis gracilis*, Hall, but distinguished from all the forms of that plant by its longer, lateral branchlets, and their more numerous segments. It may eventually prove to be only a varietal form of Hall's species, but after comparing the British examples with authentic specimens of *Bythotrephis gracilis*, I think its differences demand a specific distinction.

Probably the plant figured by Jates (Trans. Geo. Soc. 2nd ser. vol. ii. pl. xxvii. fig. 2) belongs to this species. His specimen came from the "Slate clay at Colmore's Farm, Bromsgrove, Lickey."

Horizon.—Upper Silurian, Wenlock Shale.
Locality.—British. Shropshire: Malvern.

Bythotrephis flexuosa, Emmons, sp.

Bythotrephis (?) flexuosa.
Göppert, Flora d. Sil. Devon. u. Unter Kohl. p. 452, pl. xxxv. fig. 6*a*.
Hall, Palæontol. New York, Geol. vol. i. p. 263, pls. lxix. and lxix*a*.
Schimper, Traité d. Paléont. Végét. vol. i. p. 199.

Fucoides flexuosa.
Emmons, Taconic System p. 67, pl. v. fig. 3.
„ Agriculture of New York, vol. i. pl. xvii. fig. 3, 1846.

Ficoides rigida.
Emmons, Taconic System, p. 67, pl. v. fig. 2.
" Agriculture of New York, pl. xvii. fig. 2, 1846.
Jates, Trans. Geol. Soc. 2nd ser. vol. ii. p. 256, pl. xxvii. fig. 1.

Remarks.—This species approaches somewhat closely to *Bythotrephis gracilis* var. *crassa*, but appears to branch more freely than that species. Mr. Jates has figured a specimen from Colmore's Farm, Bromsgrove, Lickey, which is evidently referable to this Alga.
Horizon.—Upper Silurian, Wenlock Limestone.
Locality.—*British.* Shropshire, Malvern.

Bythotrephis, sp.

Remarks.—The specimens placed here may be only a variety of *Bythotrephis divaricata*, but are too fragmentary to allow of a satisfactory determination.
Horizon.—Upper Silurian.
Localities.—*British.* Herefordshire : Leintwardine. Shropshire : Ludlow : Malvern Tunnel.

Algoidal (?) Impression.

Remarks.—These small fossils, which appear to be algoidal, are branched, and have their branchlets covered with fine segments, giving to them a plumose character. All the specimens are fragmentary, but I am not aware of any described species to which they can be referred.
Horizon.—Upper Silurian.
Localities.—*British.* Herefordshire : Row Bridge, near Leintwardine : Brandon Camp.

GENERA INCERTÆ SEDIS.

GLYPTODENDRON, Claypole, 1878.

Geol. Mag., Dec. 2, vol. v. p. 558.

Glyptodendron Eatonense, Claypole.

Glyptodendron Eatonense.
Claypole, Geol. Mag. vol. v. p. 558, fig., 1878.

Remarks.—This species is only represented in the Collection by a gutta-percha impression.
Horizon.—Upper Silurian, Clinton Limestones.
Locality.—*Foreign.* United States : Eaton, Ohio (Presented by Prof. E. W. Claypole, B.A.).

PROTOTAXITES, Dawson, 1859.

Quart. Journ Geol. Soc. vol. xv. p. 484.

Prototaxites Hicksii, Etheridge, sp.

Prototaxites Hicksii.
Dawson, Foss. Plants, Devon. and Upper Sil. Form. of Canada, p. 108, 1882.

Nematophycus Hicksii.
Etheridge, Quart. Journ. Geol. Soc. vol. xxxvii. p. 490, pl. xxv. figs. 1–6.
Horizon.—Lower Silurian, Lower Llandovery.
Locality.—*British.* Denbighshire : Pen-y-Glog, Corwen (Presented by H. Hicks, Esq., M.D., F.R.S.).

PACHYTHECA, Hooker, 1861.

In Salter, Quart. Journ. Geol. Soc. vol. xvii. p. 162.

Pachytheca sphærica, Hooker.

Pachytheca sphærica.
Hooker in Salter, Quart. Journ. Geol. Soc. vol. xvii. p. 162, 1861.

Pachytheca.
Etheridge, Quart. Journ. Geol. Soc. vol. xxxvii. pl. xxv. figs. 8, 9.

Ætheotesta.
Dawson, Foss. Plants, Devon. and Upper Sil. Form. of Canada, pt. ii. p. 108, fig. 1.

Horizon.—Upper Silurian, Ludlow Bone-Bed.
Locality.—British. Herefordshire : Much March.

INCERTÆ SEDIS.

Stem.

Remarks.—The vegetable matter has been converted into a bright coaly substance.
Horizon.—Upper Silurian.
Locality.—British. Denbighshire : Corwen (Presented by H. Hicks, Esq., M.D., F.R.S.).

Vegetable Impressions.

Remarks.—These specimens show carbonized remains of fossil plants.
Horizon.—Upper Silurian, Downton Tilestones, Upper Ludlow.
Locality.—British. Herefordshire : Dormington.

APPENDIX.

APPENDIX.

The following are additions to the Collection since the Catalogue was prepared. I have also added a few references, inadvertently omitted from their proper places :—

EQUISETACEÆ.

CALAMITES, Suckow (*ante*, p. 22).

Remarks.—From the evidence brought forward by Weiss in his Steinkohlen-Calamarien, pt. ii.,* it seems now clearly settled that though the members of the genus *Calamites* with thin barks are furrowed on their outer surface, those with a thick cortical envelope have a smooth exterior : the latter I previously placed in *Calamitina*, Weiss,† treating that genus as distinct from *Calamites*.

Weiss now regards his *Calamitina* more as a well-marked division of the genus *Calamites* than as a distinct genus. This, perhaps, in the present state of information, is the best course to take, but it is extremely probable that the genus *Calamites* will eventually require to be broken up into several genera.

Calamites ramosus, Artis, sp.

Calamites ramosus (*ante*, p. 26).

Calamites (*Eucalamites*) *ramosus*.

Weiss, Steinkohlen-Calamarien, pt. ii. p. 98, pl. iii. fig. 3, pl. v. figs. 1, 2, pls. vi. and vii. figs. 1, 2, pl. viii. figs. 1, 2, 4, pl. ix. figs. 1, 2, pl. x. fig. 1, pl. xx. figs. 1, 2.

Calamites varians var. (*ante*, p. 31).

Locality (additional).—*Foreign.* United States : Pennsylvania.

CALAMOCLADUS, Schimper (*ante*, p. 38).

Calamocladus equisetiformis, Schlotheim, sp. (*ante*, p. 38).

Locality (additional).—*Foreign.* Westphalia : Langendreer.

* Weiss, in Abhandl. z. Geol. Specialkarte Preussen u. d. Thüringischen Staaten. Band v. heft 2, Berlin, 1884.

I am very sorry that I have been unable to avail myself of this valuable addition to the literature of the *Calamariæ* in the preparation of the earlier pages of this catalogue.

† Steinkohlen-Calamarien, pt. i. p. 126, 1876 (Abhandl. z. Geol. Specialkarte Preussen u. d. Thüringischen Staaten. Band ii. heft i.).

ANNULARIA, Sternberg (*ante*, p. 43).

Annularia radiata, Brongniart, sp. (*ante*, p. 43).

Remarks.—I have stated on p. 28 that although believing *Annularia radiata* to be the foliage of *Calamites ramosus*, I kept them separate till the subject be more fully investigated. Since this part of the Catalogue was put in type, Weiss has shown in part ii. of his Steinkohlen-Calamarien that *Annularia radiata*, Brongt., is the foliage of *Calamites ramosus*.

Weiss also gives figures and descriptions of the fruit, stems, and roots of this species.

Annularia sphenophylloides, Zenker (*ante*, p. 44).

Locality (additional).—*Foreign.* United States : Pennsylvania.

Annularia stellata, Schlotheim, sp.

Annularia stellata (*ante*, p. 45).

As its Fruit :—

Stachannularia tuberculata (*ante*, p. 55).

Calamostachys tuberculata with *Annularia longifolia*.
Weiss, Steinkohlen-Calamarien, pt. ii. p. 178, 1884.

Remarks.—While writing the earlier part of this Catalogue I omitted to note a remark made by Sterzel in his description of the fruit of *Annularia sphenophylloides*,* where he mentions the occurrence of specimens of *Annularia stellata* (*A. longifolia*) with *Stachannularia tuberculata* organically attached.

Stachannularia tuberculata must therefore be united with *Annularia stellata* as its fruit.

Locality (additional).—*Foreign.* Thuringia : Gera.

MACROSTACHYA, Schimper (*ante*, p. 57).

Macrostachya infundibuliformis, Brongt. (*ante*, p. 57).

Locality (additional).—*Foreign.* United States : Pennsylvania.

PINNULARIA, Lindley and Hutton (*ante*, p. 58).

Pinnularia capillacea, Lindley and Hutton (*ante*, p. 58).

Locality (additional).—*Foreign.* Westphalia : Bochum.

SPHENOPTERIDEÆ.

RENAULTIA, Zeiller (*ante*, p. 64).

Renaultia microcarpa, Lesquereux, sp. (*ante*, p. 64).

Locality (additional).—*British.* Worcestershire : Forest of Wyre.

ZEILLERIA, Kidston (*ante*, p. 66).

Zeilleria delicatula, Sternberg, sp. (*ante*, p. 66).

Sphenopteris Harveyi.
Lesquereux, Coal Flora in Pennsyl. vol. iii. p. 766, pl. ciii. figs. 7, 7*b*, 1884.

* Zeitsch. d. Deut. Geol. Gesell. 1882, p 685.

Remarks.—As far as can be learned from the description and figure of Lesquereux's *Sphenopteris Harveyi* it seems to be identical with the fruiting specimens of *Zeilleria* (*Sphenopteris*) *delicatula*, Sternberg, which were described by me in 1884 (Quart. Journ. Geol. Soc. 1884, p. 590, pl. xxv.). The specimen figured by Lesquereux does not appear to be so well preserved as those in the Collection, but the characters it shows agree perfectly with the British examples. Lesquereux's description of *Sphenopteris Harveyi* and my paper on *Zeilleria delicatula*, Sternb., sp., were both in course of publication at the same time, so neither had the opportunity of availing himself of the other's investigations. Since seeing my paper Lesquereux has informed me that he is also of opinion that his *Sphenopteris Harveyi* is similar to *Zeilleria delicatula*.

CALYMMOTHECA, Stur, emend. (*ante*, p. 66).

Calymmotheca bifida, L. and H., sp. (*ante*, p. 68).

Sphenopteris (*Diplothmema*) *Tracyana.*
Lesquereux, Coal Flora in Pennsyl. vol. iii. p. 766, pl. ci. fig. 2, 1884.

Remarks.—*Sphenopteris Tracyana* seems to be synonymous with *Calymmotheca* (*Sphenopteris*) *bifida*, L. and H. Lindley and Hutton's type of the species is certainly not well preserved, and is misleading as to the real characters of this fern. The most characteristic figure of *Calymmotheca bifida*, L. and H., sp., with which I am acquainted is the woodcut given by Hugh Miller (Testimony of the Rocks, 1st ed., p. 466, fig. 129). This will at once show the identity of Lesquereux's species with Lindley and Hutton's plant.

SPHENOPTERIS, Brongniart (*ante*, p. 68).

Sphenopteris obtusiloba, Brongniart (*ante*, p. 68).

Locality (additional).—*Foreign.* Silesia: Waldenburg.

Sphenopteris trifoliolata, Artis, sp. (*ante*, p. 71).

Locality (additional).—*Foreign.* Rhenish Prussia: Eschweiler, near Aachen.

Sphenopteris elegans, Brongniart (*ante*, p. 79).

Locality (additional).—*Foreign.* Silesia: Waldenberg.

Sphenopteris divaricata, Göppert, sp.

Sphenopteris divaricata.
Lesquereux, Coal Flora of Pennsyl. vol. iii. p. 767, pl. civ. fig. 6.
Stur, Culm Flora, heft i. p. 25, pl. vi. figs. 6, 7.
Unger, Genera et Species, p. 111.

Calymmotheca divaricata.
Stur, Culm Flora, heft ii. p. 271, pl. xxx. fig. 1–3.

Cheilantheites divaricatus.
Göppert, Syst. Fil. Foss. p. 238, pl. xii. figs. 1, 2.

Sphenopteris elegans.
Sternberg, Vers ii. p. 56, pl. xx. figs. 3, 4.

Horizon.—Culm, Lower Carboniferous.
Locality.—*Foreign.* Silesia: Waldenburg.

Sphenopteris distans, Sternberg.

Sphenopteris distans.
Brongniart, Prodrome, p. 51.
„ Hist. d. Végét. Foss. p. 198, pl. liv. fig. 3.

Ettingshausen, Denks. d. Akad. Wiss. vol. xxv. p. 94.
Geinitz, Flora d. Hainich.-Ebersdorfer. p. 38, pl. ii. figs. 3-7.
Schimper, Traité d. Paléont. Végét. vol. i. p. 390.
Sternberg, Vers. i. fasc. 4, p. xvi. ; Vers. ii. p. 62.
Stur, Culm Flora, heft i. p. 23, pl. vi. figs. 2-5.
Unger, Synop. Plant. Foss. p. 63.
„ Genera et Species, p. 114.

Cheilantheites distans.
Göppert, Syst. Fil. Foss. p. 243, pl. ix. figs. 1, 2.

Diplothmema distans.
Stur, Culm Flora, heft ii. p. 243, pl. xxxii. figs. 2-5, pl. xxxiv. fig. 1.

Gymnogramme obtusiloba.
Ettingshausen (non Brongniart), Denks. d. Akad. Wiss. vol. xxv. p. 98, fig. 6.

Sphenopteris Hoeninghausi.
Feistmantel (non Brongniart), Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 504, pl. xiv. fig. 7.

Filicites bermudensiformis.
Schlotheim, Flora d. Vorwelt, p. 49, pl. x. fig. 18 (central fern).

Horizon.—Culm, Lower Carboniferous.
Locality.—Foreign. Silesia : Waldenburg.

NEUROPTERIS, Brongniart (*ante*, p. 85).

Neuropteris heterophylla, Brongniart (*ante*, p. 85).

Locality (additional). — *Foreign.* Rhenish Prussia : Eschweiler, near Aachen.

Neuropteris gigantea, Sternberg (*ante*, p. 92).

Localities (additional).—*Foreign.* Silesia : Waldenburg. Westphalia : Buer.

Neuropteris flexuosa, Sternberg (*ante*, p. 93).

Locality (additional).—*Foreign.* Silesia : Waldenburg.

ODONTOPTERIS, Brongniart (*ante*, p. 104).

Odontopteris Reichiana, Gutbier.

Odontopteris Reichiana (*ante*, p. 104).
Delete reference "Feistmantel, Vers. d. Böhm. Kohlenab. p. 290, pl. lxvii. figs. 4, 5 (*O. Bohmii*)." The fern here identified as *O. Bohmii* is, according to Weiss, *Neuropteris Stradonitzensis*, Andrae, sp. See Weiss, "Über *Neuropteris Stradonitzensis*, Andrae, sp." (Neues Jahrbuch, 1881.)

PECOPTERIDEÆ.

MARIOPTERIS, Zeiller (*ante*, p. 109).

Mariopteris muricata, Schlotheim, sp. (*ante*, p. 109).

Localities (additional).—*Foreign.* Rhenish Prussia : Eschweiler. Silesia Waldenburg.

PECOPTERIS, Brongniart (*ante*, p. 113).

Pecopteris arborescens, Schlotheim, sp.

Pecopteris arborescens (*ante*, p. 113).
Dawson, Canadian Nat. vol. viii. p. 446.
„ Foss. Plants Lower Carb. Canada, p. 38.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 157, vol. xxx. p. 216.
„ Geol. Survey of Canada, Reports, 1874–5, pp. 192–196.
Newberry, Explor. Exped. from Santa Fé, p. 18.
Zeiller, Ann. d. Mines, 1883, vol. iv. p. 594.

Cyatheites arborescens.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 128.
Feistmantel, Der Hangendflötzzug, p. 77.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, 298, and 306.
„ Zeitsch d. Deut. Geol. Gessll. vol. xxv. pp. 595 and 598.
„ Steinkohl. u. Perm-Ablager. p. 82 (excl. syn. *Senft. elegans*).
„ Fruchts Foss. Pflanz. aus d. Böhm. Steink. p. 45.
Geinitz, Neues Jahrbuch, 1867, p. 277.
„ Dyas, p. 140.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 18.
Römer, Zeitsch. d. Deut. Geol. Gesell. vol. ix. p. 58.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, and 143.
Unger, Neues Jahrbuch, 1842, p. 608.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 79.

Cyatheites arborescens, var. *cyathea.*
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 80.

Cyathocarpus arborescens.
Stur, Verhandl. d. k. k. Geol. Reichsanst. p. 268, 1874.

Pecopteris cyathea.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 128.
Dawson, Geol. Survey of Canada, Reports, 1874–5, p. 196.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.
„ Foss. Plants Lower Carb. Canada, p. 37.
Zeiller, Ann. d. Mines, 1883, vol. iv. p. 595.

Pecopteris cyatheoides.
Schimper, Traité de Paléont. Végét. vol. i. p. 523, pl. xli. fig. 14.

Pecopteris platyrachis.
Lesquereux, Coal Flora of Pennsyl. p. 233, pl. xli. fig. 5.

Steffensia cyatheoides.
Sternberg, Vers. ii. p. 122.

Steffensia ? leptorachis.
Sternberg, Vers. ii. p. 123.

Steffensia ? nodosa.
Sternberg, Vers. ii. p. 122.

? Hymenophyllites Costae.
Geinitz, Neues Jahrbuch, 1867, p. 276.
Gomes, Flora Foss. do Terr. Carbon. p. 13, pl. v figs. 1, 2.

Pecopteris Candolliana, Brongniart.

Pecopteris Candolliana (*ante*, p. 115).

Cyatheites Candollianus.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 128.
Feistmantel, Fruchts. Foss. Pflanz. aus d. Böhm. Steink. p. 46.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 525, pl. xvii. fig. 29.
„ Steinkohl. u. Perm-Ablager. p. 84.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 80.

Cyatheites lepidorhachis.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 128.
Geinitz, Neues Jahrbuch, p. 277, 1867.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 19.

Scolecopteris Candolleana.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 123.

Scolecopteris affinis.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 123.

Pecopteris pteroides, Brongniart.

Pecopteris pteroides (*ante*, p. 116).

Alethopteris pteroides.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 157.
„ Foss. Plants Lower Carb. Canada, p. 36.
„ Canadian Nat. vol. viii. p. 446.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. viii. p. 350.
„ Fruchts. Foss. Pflanz. aus d. Böhm. Steink. p. 50.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 295 and 303.
„ Der Hangendflötzzug, p. 79, pl. ii. figs. 2, 3, and 4.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.

Alethopteris Brongniartii.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 128.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do. Terr. Carbon. do Porto, Serra do Bussaco, p. 17.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 140.

Remarks.—The fruit of this species is figured and described by C. Feistmantel (Der Hangendflötzzug, p. 79, pl. ii. figs. 2–4).*

Pecopteris Bucklandii, Brongniart.

Pecopteris Bucklandii (*ante*, p. 117).
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.
„ Foss. Plants Lower Carb. Canada, p. 37.

Alethopteris Bucklandii.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 17.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.

* Archiv. d. Naturw. Landesdurchforschung von Böhmen. iv. Band. No. 6 (Geologische Abtheil.), Prag. 1881.

Pecopteris oreopteridia, Schlotheim, sp.

Pecopteris oreopteridia (*ante*, p. 118).
Boulay, Recherches d. Paléont. Végét. dans. le Terr. Houil. du Nord de la France, p. 18.*

Pecopteris oreopteroides.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants Lower Carb. Canada, p. 37.

Pecopteris oreopteridis.
Stur, Verhandl. d. k. k. Geol. Reichsanst. 1884, p. 141.

Cyatheites oreopteridis.
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 128.
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 83.
„ Fruchts Foss. Pflanz. aus d. Böhm. Steink. p. 46.
„ Zeitsch. der Deut. Geol. Gesell. vol. xxv. p. 595.
„ Der Hangendflötzzug, p. 74.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 19.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, 143.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 80

Cyatheites oreopteroides.
Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, and 301.

Cyatheites oreopteridius.
Unger, Neues Jahrbuch, 1842, p. 608.

Pecopteris villosa, Brongniart.

Pecopteris villosa (*ante*, p. 119).
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.
„ Foss. Plants Lower Carb. Canada, p. 37.
Lesquereux, Report, Geol. Survey of Illinois, vol. iv. p. 402.

Cyatheites villosus.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 80.

Phthinophyllum villosum.
Stur, Culm Flora, heft ii. p. 293.

Pecopteris polymorpha, Brongniart.

Pecopteris polymorpha (*ante*, p. 119).
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.
„ Foss. Plants Lower Carb. Canada, p. 36.
Zeiller, Ann. d. Mines, 1883, vol. iv. p. 595.

Pecopteris Miltoni, Artis, sp.

Pecopteris Miltoni (*ante*, p. 120).
Boulay, Recherches de Paléont. Végét. dans le Terr. Houil. du Nord de la France, p. 17.

Cyatheites Miltoni.
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 128.

* Ann. de la Soc. Scientifique d. Bruxelles, 4me année, 1880, 2e part.

Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595–598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 295, 298, and 301.
„ Steinkohl. u. Perm.-Ablager. p. 83.
„ Der Hangendflötzzug, p. 75.
Geinitz, Neues Jahrbuch, 1869, p. 463, 1867, p. 277.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 20.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142, 143.
Unger, Neues Jahrbuch, 1842, p. 608.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 81.

Alethopteris aquilina.
Geinitz, Vers. d. Steinkf. in Sachsen, pl. xxxi. figs. 5–7.

Remarks.—The plant figured by Geinitz as *Alethopteris aquilina* in his Versteinerungen d. Steinkohlenformation in Sachsen is evidently to be referred to *Pecopteris Miltoni.*

Pecopteris abbreviata, Brongniart.

Pecopteris abbreviata (*ante*, p. 121).
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 129.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 446.
„ Quart. Journ. Geol. Soc. vol. xxx. p. 216.
„ Foss. Plants Lower Carb. Canada, p. 36.
Geinitz, Neues Jahrbuch, 1867, p. 278.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 26.
Zeiller, Bull. Soc. Géol. France, 3e sér. vol. xii. p. 200.

Pecopteris unita, Brongniart.

Pecopteris unita (*ante*, p. 122).
Dawson, Geol. Survey of Canada, Reports, 1874–5, p. 192.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 158, vol. xxx. p. 216.
„ Canadian Nat. vol. viii. p. 446.
„ Foss. Plants Lower Carb. Canada, p. 38.
Geinitz, Neues Jahrbuch, p. 278.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 25.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 140.
Zeiller, Ann. d. Mines, 1883, vol. iv. p. 595.

Cyatheites unitus.
Feistmantel, Steinkohl. u. Perm.-Ablager. p. 83.
„ Der Hangendflötzzug, p. 76.
Geinitz, Jahrb. d. k. k. Geol. Reichsanst. 1857, p. 350.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 81.

Pecopteris longifolia.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.
„ Foss. Plants Lower Carb. Canada, p. 37.
Stur, Verhandl. d. k. k. Geol. Reichsanst. 1874, p. 302.

Diplazites longifolius.
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 127.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 14.

Diplazites emarginatus.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do Terr Carbon. do Porto, Serra do Bussaco, p. 14.

Cyatheites elegans.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 81.

Pecopteris Defrancii, Brongniart.

Pecopteris Defrancii (*ante*, p. 124).

Alethopteris Defrancii.
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 127.
Unger, Neues Jahrbuch, 1842, p. 608.

Lonchopteris Defrancii.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 83.

Pecopteris arguta, Brongniart.

Pecopteris arguta (*ante*, p. 128).

Cyatheites argutus.
Feistmantel, Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. p. 295.
„ Steinkohl. u. Perm.-Ablager. p. 84.
„ Der Hangendflötzzug, p. 76.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. p. 81, 1868.

Aspidites argutus.
Göppert, Syst. Fil. Foss. p. 359.

Polypodites elegans.
Geinitz, Neues Jahrbuch, 1867, p. 277.
Gomes, Flora Foss. do. Terr. Carbon. do Porto, Serra do Bussaco, p. 21.

Pecopteris integra, Andrae, sp.

Pecopteris integra (*ante*, p. 127).
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 127.

Sphenopteris integra.
Andrae, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 79.
Römer, Palaeontographica, vol. ix. p. 23.

Pecopteris truncata, Rost.

Pecopteris truncata (*ante*, p. 128).

Asterocarpus truncatus.
Andrae, Verhandl. d. Naturwis. Vereines, Halle, 1850, p. 129.

Alethopteris truncata.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1862, p. 82.

DICKSONIITES, Sterzel, 1883.

Botanisches Centralblatt, Band xiii. Nos. 8, 9.

Dicksoniites Pluckeneti, Schlotheim, sp.

Dicksoniites Pluckenetii.
Sterzel, Botanisches Centralblatt, vol. xiii. Nos. 8, 9, pl. vi.

Pecopteris Pluckenetii (*ante*, p. 125).
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 129.
Dawson, Quart. Journ. Geol. Soc. vol. xxii. p. 159.
„ Canadian Nat. vol. viii. p. 447.

Dawson, Foss. Plants Lower Carb. Canada, p. 37.
Geinitz, Gaea v. Sachsen, p. 83.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 140.

Alethopteris Pluckenetii.
Feistmantel, Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 295 and 298.
" Steinkohl. u. Perm.-Ablager. p. 87.
" Zeitsch. d. Deut. Geol. Gesell. vol. xxv. p. 598.
Geinitz, Neues Jahrbuch, 1867, p. 284.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 82.

Aspidites Pluckeneti.
Geinitz, Neues Jahrbuch, 1867, p. 278.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 22.

Diplothmema Pluckenetii.
Stur, Culm Flora, heft ii. p. 230.

Pecopteris bifurcata.
Schimper, Traité d. Paléont. Végét. vol. i. p. 531.

Sphenopteris bifurcata.
Ettingshausen, Steinkf. v. Radnitz, p. 39.

Aspidites bifurcatus.
Göppert, Syst. Fil. Foss. p. 359.

Remarks.—The fructification of this fern has been described by Sterzel, who has proposed for this species the new genus *Dicksoniites*. The fruit is not very well preserved, but in a sufficiently good state to show that its form is altogether new to Fossil Botany, and of a nature that affords characters for generic distinction.

CALLIPTERIDIUM, Weiss, 1870.

Zeitschrift der Deut. Geol. Gesellschaft. vol. xxii. p. 858.

Callipteridium ovatum, Brongniart, sp.

Callipteridium ovatum.
Renault, Cours de Botan. Foss. 1883, p. 155.

Pecopteris ovata, Brongniart (*ante*, p. 127).

Alethopteris ovata.
Andrae, Jahrb. d. Naturwis. Vereines, Halle, 1850, p. 127.

Callipteris mirabilis.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 77.

Remarks.—This plant, which holds a somewhat anomalous position, possesses in part the characters of *Neuropteris* and *Pecopteris*, though from the former genus it is clearly separated by the pinnules being more or less united among themselves and attached to the rachis by the whole of their base. It has also close affinities to the genus *Callipteris*. It was included in *Pecopteris* (*ante*, p. 127), but further investigations have led me to adopt for it the genus *Callipteridium*, Weiss. This genus is placed by some authors in *Neuropterideæ*, but from the pinnules being attached to the rachis by the whole of their base, I am more inclined to retain it in *Pecopterideæ*.

DACTYLOTHECA, Zeiller (*ante*, p. 128).

Dactylotheca plumosa, Artis, sp. (*ante*, p. 128).

Pecopteris plumosa.
Dawson, Foss. Plants Lower Carb. Canada, p. 36.
„ Canadian Nat. vol. viii. p. 447.
Geinitz, Neues Jahrbuch, 1867, p. 278.
Gomes, Foss. Flora do Terr. Carbon. do Porto, Serra do Bussaco, p. 24.

Cyatheites plumosus.
Unger, Neues Jahrbuch, 1842, p. 608.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 80.

Senftenbergia plumosa.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 44.

Cyatheites dentatus.
Feistmantel, Fruchts. Foss. Pflanzen aus d. Böhm. Steink. p. 46.
„ Zeitsch. d. Deut. Geol. Gesell. vol. xxv. pp. 595 and 598.
„ Jahrb. d. k. k. Geol. Reichsanst. vol. xxii. pp. 292, 298, 301, 303, 306.
„ Steinkohl. u. Perm.-Ablager. p. 85 (*in part*).
„ Der Hangendflötzzug, p. 76.
Geinitz, Neues Jahrbuch, 1867, p. 284.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.
Unger, Neues Jahrbuch, 1842, p. 608.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rheinl. u. Westph. 1868, p. 80.

Pecopteris acuta.
Dawson, Foss. Plants Lower Carb. Canada, p. 37.
„ Quart. Journ. Geol. Soc. vol. xxii. p. 158.
„ Canadian Nat. vol. viii. p. 447.

Cyatheites acutus.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rhenil. u Westph. 1868, p. 80.

Senftenbergia acuta.
Stur, Morph. u. Syst. d. Culm u. Carbonfarne, p. 44.

Pecopteris delicatula.
Geinitz, Neues Jahrbuch, 1867, p. 278.
Gomes, Flora Foss. do Terr. Carbon. do Porto, Serra do Bussaco, p. 25.

Cyatheites delicatulus.
Weiss, Verhandl. d. Natur. Vereines d. Preuss. Rhenil. u. Westph. 1868, p. 81.

Sphenopteris caudata.
Sternberg, Vers. ii. p. 64.

Pecopteris silesiaca.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141, 142.

Aspidites silesiacus.
Stur, Verhandl. d. k. k. Geol. Reichsanst. p. 300, 1874.

Pecopteris Glockeriana.
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. p. 143.

Pecopteris Glockeriana, var. *falciculata.*
Stur, Jahrb. d. k. k. Geol. Reichsanst. vol. xii. pp. 141 142

Steffensia ? Glockeri.
Sternberg, Vers. ii. p. 124.

ALETHOPTERIDEÆ.

ALETHOPTERIS, Sternberg (*ante*, p. 132).

Alethopteris lonchitica, Schlotheim, sp. (*ante*, p. 132).

Localities (additional).—*British.* Lanarkshire : Kiltongue Coal, Mount Vernon.

Foreign.—United States : Pennsylvania.

Alethopteris Serlii, Brongniart, sp. (*ante*, p. 135).

Locality (additional).—*Foreign.* United States : Pennsylvania.

LONCHOPTERIS, Brongniart (*ante*, p. 139).

Lonchopteris rugosa, Brongniart (*ante*, p. 139).

Locality (additional). — *Foreign.* Rhenish Prussia : Eschweiler, near Aachen.

TÆNIOPTERIDEÆ.

GLOSSOPTERIS, Brongniart, 1828.
Prodrome d'une Histoire des Végétaux Fossiles, p. 55.

Glossopteris Browniana, var. **Australasica,** Brongniart.

Glossopteris Browniana var. *Australasica.*
Brongniart, Hist. d. Végét. Foss. p. 223, pl. lxii. fig. 1.
Etheridge, Cat. Australian Foss. p. 31.
Feistmantel, Palaeontographica, supp. iii. lief. iii. p. 78, 1878.
Schimper, Traité d. Paléont. Végét. vol. i. p. 646.

Horizon.—Coal Measures.
Localities.—Foreign. Australia : Newcastle and Port Stephens, New South Wales.

LYCOPODIACEÆ.

LEPIDODENDRON, Sternberg (*ante*, p. 148).

Lepidodendron Sternbergii, Brongniart (*ante*, p. 148).

Locality (additional).—*Foreign.* Westphalia : Langendreer.

Lepidodendron aculeatum, Sternberg (*ante*, p. 153).

Localities (additional).—*Foreign.* Westphalia : Carpe ; Wattenscheidt ; Werden.

Lepidodendron rimosum, Sternberg (*ante*, p. 158).

Locality (additional).—*Foreign.* Westphalia : Wattenscheidt.

CONIFERÆ.

ARAUCARIOXYLON, Kraus (*ante*, p. 220).

Araucarioxylon Brandlingi, Witham, sp.

Araucarioxylon Brandlingi.
Feistmantel, Der Hangendflötzzug, p. 93.
Schimper, Traité d. Paléont. Végét. vol. ii. p. 382.
Sterzel, Naturwiss. Gesell. v. Chemnitz, 1873–74, p. 230.

Araucarites Brandlingi.
Andrae, Jahrb. d. Naturwiss. Vereines, Halle, 1850, p. 130.
Bronn, Index Palæont. p. 91.
Germar, Vers. v. Wett. u. Löbejun, p. 49, pls. xxi. and xxii.
Giebel, Deutschl. Petrefacten, p. 113.
Göppert, Foss. Flora d. Perm. Form. p. 255.
,, Mon. d. Foss. Coniferen, p. 232, pls. xxxix., xl., and xli., figs. 1–7.
Gutbier, Vers. d. Rothl. in Sachsen, p. 23.

Pinites Brandlingi.
Göppert, Mon. d. Foss. Coniferen, p. 130.
Lindley and Hutton, Foss. Flora, vol. i. pl. i.
Renault, Cours d. Botan. Foss. 1881, p. 83.
Unger, Synop. Plant. Foss. p. 205.
Witham, Intern. Structure of Foss. Vegetables, p. 73, pl ix. figs. 1–6, pl. x. figs. 1–6, and pl. xvi fig. 3.

Dadoxylon Brandlingii.
Endlicher, Synop. Conif. Foss. p. 35.
Grand 'Eury, Flore Carbon. du Dép. de la Loire, p. 264.
Unger, Genera et Species, p. 379.

Horizon.—Coal Measures.
Localities.—British. Shropshire: Madeley Court. Worcestershire: Bewdley.

LIST OF WORKS QUOTED.

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Abbreviated Title used.	Title and Reference.
Abhandl. d. k. k. Geol. Reichsanst.	Abhandlungen der Kais.-Königlichen Geologischen Reichsanstalt. *Vienna.*
Act. Acad. Nat. Curios.	Verhandlungen der Kaiserlichen Leopoldinisch-Carolinischen Akademie der Naturforscher. (Nova Acta Academiæ Cæsareæ Leopoldino - Carolinæ Naturæ Curiosorum). *Breslau.*
Act. Acad. Theod. Palat.	Academia Electoralis Scientiarum et Elegantium Literarum Theodoro-Palatina. *Mannheim.*
Amer. Jour. of Science	American Journal of Science and Arts. *New Haven.*
Andrae, Vorwelt. Pflanzen.	Andrae, C. J., Vorweltliche Pflanzen aus dem Steinkohlengebirge der preussischen Rheinlande und Westphalens. *Bonn.* 1865–69.
Annal. and Mag. Nat. Hist.	Annals and Magazine of Natural History. *London.*
Ann. d. Mines	Annales des Mines. *Paris.*
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Synonyms are printed in italics.

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